DOCUMENT RESUME

ED 213 896 CE 031 570

AUTHOR	Hamblen, Ron
TITLE	Plastering. Pre-Apprenticeship Phase 2 Training. Student Training Modules.
INSTITUTION	Lane Community Coll., Eugene, Oreg.
SPONS AGENCY	Employment and Training Administration (DOL), Washington, D.C.; Oregon State Dept. of Education, Salem.
PUB DATE	81
NOTE	371p.; For related documents see CE 031 561-579.
EDRS PRICE	MF01/PC15 Plus Postage.
DESCRIPTORS	Behavioral Objectives; *Building Trades; Ceilings; Check Lists; Job Skills; Learning Activities; Learning Modules; Pacing; Postsecondary Education; Structural Elements (Construction); Tests; *Trade and Industrial Education; Two Year Colleges; Vocabulary
IDENTIFIERS	*Plasterers; Plasters; *Preapprenticeship Programs

ABSTRACT

These 20 Student Training Modules on plastering comprise one of nine sets of self-paced learning modules developed for Pre-Apprenticeship Phase 2 Training. (A companion instructor's guide is available separately as CE 031 569.) The modules are designed to impart trade knowledge and skills to the student. Each module contains some or all of the following: cover sheet listing module title, goals, and performance indicators; study guide/checklist with directions for module completion; introduction; vocabulary listing and defining new trade or technical terms; supplementary references; information sheet(s) providing information and graphics covering the module topic(s); self-assessment; self-assessment answers; assignment sheet(s); job sheet(s) listing materials and tools necessary to complete tasks designed to develop manipulative skill; post assessment; and post assessment answers. Topics covered in the module include plastering systems; basic lathing materials and techniques, preparing surfaces for plastering, aggregates and admixtures, materials and mixing of gypsum base coats, gypsum finish coats, veneer plasters, stucco plasters, new systems, loading the hawk and trowel, patching cracks and holes, setting dots and screeds, using a scratcher, applying and spreading plaster, rodding and darbying, floating, using stilts, spraying equipment, ornamental plastering, and templates. (YLB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED213896

CE031570

LANE COMMUNITY COLLEGE

PRE-APPRENTICESHIP
PHASE 2 TRAINING
Student Training Modules

Plastering

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

● Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

C. Hostrup

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Plastering Module Writer:
Ron Hamblen

Technical Assistance:
Tom Tallerday

Graphics: Ralph Bentley

Editorial, Proofreading and Pasteup:
Debi Carroll, Shannon Kracht

Typing:
Strandlien Typing Service

This project was developed under a subcontract for the Oregon Department of Education by Lane Community College, Community Education Division, Eugene, Oregon. Funds were provided by the Governor of Oregon from the Educational Linkages Component of the CETA Governor's Grant.

STATEMENT OF ASSURANCE

It is the policy of the Oregon Department of Education that no person be subjected to discrimination on the basis of race, national origin, religion, sex, age, handicap or marital status in any program, service or activity for which the Oregon Department of Education is responsible. The Department will comply with the requirements of state and federal law concerning non-discrimination and will strive by its actions to enhance the dignity and worth of all persons.

Lane Community College

4000 E. 30th Avenue
Eugene, Oregon 97405
(503) 726-2200

Office of the President

July 27, 1981

On behalf of Lane Community College, I wish to express our pride and gratitude for the opportunity to participate in the development of the Pre-Apprenticeship training materials. We also wish to commend the Oregon Department of Education for its original concept and continued support; and, the Educational Linkages Component of the CETA Governor's Grant for funding.

The goals of this project are many, but none are more important than that of producing valid, understandable vocational curriculum material. We congratulate the tradespeople and production staff for thier accomplishments.

Finally, I recommend this material to anyone exploreing Pre-Apprenticeship as an entry into the vocational work world, with the hope and belief that it will go a long way toward producing skilled craftspeople who are dedicated to their work.

Sincerely,

Eldon G. Schafer

Eldon G. Schafer

COMMON PLASTERING SYSTEMS

Goal:

The student will be able to identify various plastering systems and explain their common uses.

Performance Indicators:

The student will successfully complete a Self Assessment, an Assignment and Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2, ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Vocabulary section. Vocabulary words are important for a good understanding of the trade. After you have studied the vocabulary, ask your teacher to quiz you on the words and their meanings.

4. ____ Study the Information section. This section will give you the information you need to understand the subject.

5. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

6. ____ Do the Assignment page. Follow the instructions at the top of the Assignment page.

7. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

The plasterer works with many different kinds of materials and covers many different kinds of surfaces. Each kind of material can do certain things. Each kind of surface needs certain kinds of preparations. What will work in one place with one material will not always work in another place. This module will help you learn what the common plastering systems are and the common uses of these plastering systems.

Vocabulary

Trade terms are very important for a good understanding of the trade. Study these words and meanings. When you have learned them, ask your teacher to quiz you on the words and their meanings.

GYPSUM BOARD LATH--Panels made with slabs of gypsum wrapped in layers of treated paper.

METAL LATH--Best bonding surface for plaster, a metal mesh of galvanized steel or wire.

WOOD LATH--Oldest base for plastering, not used much. Make by nailing thin strips of wood to a framework, with strips spaced to provide bond for plaster.

SCRATCH COAT--First coat of plaster. Stiffens lath and serves as a foundation for the plaster wall. It is scratched to make a good bond surface for the next coat.

BROWN COAT--Second coat of plaster. Builds up and straightens the surface.

FINISH COAT--The final surface, which may be textured with different techniques.

NEAT PLASTER--Gypsum plaster before sand or other aggregates have been added.

GAUGING PLASTER--Special plaster mixes which are made to set fast and within a definite time period.

MOLDING PLASTER--Finely ground plaster that is used for work with fine details.

KEENES CEMENT--Not a cement; a high strength gauging plaster.

FINISHING LIMES--Added to gypsum plasters and stucco to give bulk, plasticity and ease of spread for the finish coat. Lime, by itself, will not set.

GYPSUM--Made from gypsum rock.

LIME--Made from limestone rock.

PORTLAND CEMENT--A type of cement, not a brand name. Made from lime, silica, iron oxide and other materials.

ADMIXTURE--Something that is added to plaster to get a special effect such as to slow down or speed up set, better bonding, etc.

AGGREGATE--Added to give hardness, strength, body. Most common aggregate is sand.

PERLITE--Aggregate used to give added fire resistance, insulation, bulk, volume.

VERMICULITE--Similar to perlite.

BONDING AGENT--Something put on a base to help plaster bond to the base. Most often used on masonry or old plaster.

PLASTICITY--Ability to be spread or moved around. Before plaster has set it can be moved around; it is "plastic."

SUCTION--Ability of the base to absorb moisture. Helps fresh plaster stick to the base.

Supplementary References

1. Van den Branden, F. and T. Hartsell. Plastering Skills and Practice. 1971. pp 117-132.

2. Cota, D. L. Walls and Ceilings. November, 1977. pp. 15-17.

Information

The plasterer covers walls, ceilings and other surfaces that divide areas or decorate them. The plaster itself is made in different ways for different purposes. Some plaster is for inside use only because water or moisture will damage it. Plaster can be put on in two or three coats. Each coat is made a bit differently from the others, and each one is put on with special techniques.

The whole thing may seem complicated, but there are only three basic kinds of plaster systems:

1. Gypsum plaster (made with gypsum).
2. Veneer plaster (made with a special gypsum).
3. Stucco plaster (made with portland cement).

Along with these three plaster systems for covering surfaces, the plasterer also works with some other materials which are applied the same as plaster. These materials include a fiberglass "mortar" that is troweled onto concrete blocks to hold the blocks together, and several acrylic or plastic systems which are often used with exterior insulation. They are put on specially prepared insulation board. Some of the trade names for these systems are Dryvit and Settef. All manufacturers have their own name for the system they make and sell.

PLASTERING: BASIC PROCESSES

The basic process of plastering can be divided into 2 parts:

1. Making a suitable surface for applying a finish coat.
2. Applying a finish coat.

A 3-step method means applying a base coat to make a foundation, then applying a second coat to make a good, level surface for the finish coat, and finally applying the finish coat.

In other systems, the base coat can also make the surface for the finish coat. With some systems, one coat serves as a base and a finish coat. The names of the coats are Scratch Coat, Brown Coat and Finish Coat. In a 2-coat system, the scratch and brown coats are combined (put on as one coat).

BASES FOR PLASTERING MATERIALS

Rule 1: The base material that supports the plaster must always be harder and stronger than the plaster itself.

Rule 2: Never apply plaster over a base that is painted, dirty, sooty, etc. unless it is first covered with lath, bonding agent or other support for the plaster.

Bases for 2 or 3 Coat Gypsum Plaster Systems

1. Gypsum board and insulation board lath.
2. Wood lath.
3. Metal lath (if properly reinforced).

Bases for Veneer Systems

1. A gypsum board made for veneer work.
2. Concrete or other surface (if a bonding agent is put on first).

Bases for Stucco Systems

1. Masonry or cast-in-place concrete (if a bonding agent is put on first).
2. Metal lath that is attached to masonry or to wood or steel studs.
3. Old stucco that is in good condition.

Gypsum Board Lath

It is important to remember that any plaster material with lime in it cannot be used with gypsum board for base coat. Materials containing lime include stucco and Keenes cement.

Gypsum board is made in panels of several different thicknesses and sizes. The most common size may be the 4' by 8' "sheet rock" panel. A gypsum board panel is made by covering a slab of gypsum with specially treated paper. The paper is put on in several layers which are designed to make a bond for the plaster that will be applied. The outer layers of the paper covering absorb moisture (draw water from the plaster). Inner layers of the paper covering the core resist moisture (keep the core dry and rigid to resist sagging). Drywall panels are different from gypsum base panels in that drywall panels do not have these special layers of paper. Drywall is made to be painted on or covered with something other than plaster. A gypsum base panel can be covered with plaster or painted or covered with other materials.

Qualities of gypsum board:

1. Doesn't burn easily.
2. Has a good plaster bond surface.
3. Economical (other bases may need more plaster to cover them well).
4. Rigid and strong (gives extra strength to the framework it is put on).
5. Many ways to attach it to wood or metal framing: nailed, stapled, screwed, special clips.
6. Some kinds of gypsum board have high insulation or sound deadening qualities.

Metal Lath

There are four main kinds of metal lath:

1. Expanded diamond mesh lath.
2. Expanded rib lath.
3. Wire lath.
4. Sheet lath.

Metal lath can be used in more ways than any other kind of lathing material. When it is installed, the sides and ends are lapped over each other. These laps are tied with 18 gauge tie wire. It is nailed, stapled or tied to the supports every 6 inches. There has to be at least 1/4 inch space between the supports and the lath.

When installing matal lath, it is important to stretch it tight between the supports. Any slack in the lath will make an uneven coat of plaster. The plaster will be thicker where the lath is loose and thin near the support. The thin parts are weak and will often crack.

Some places metal lath may be used:

1. Wood frames on open or sheathed structures.
2. Steel frame structures.
3. Flashings.
4. Masonry surfaces that won't give a good bond by themselves.
5. Chimneys and disintegrating masonry surfaces.
6. Unsound or painted stucco.

Cautions for exterior use:

1. Cover wood or metal surfaces with waterproof paper before lathing.
2. Lath should not directly contact the wood or metal.
3. Check for loose ends, loose nails, nail heads sticking out, etc.
4. Use the right flashings, drips, expansion joints and stops. If water seeps behind the plaster, the water will ruin the plaster.

PLASTER SYSTEMS CHART

System	Where Used	Limitations	Made Of	Important Points	Advantages	Bases
Gypsum Plaster	interior surfaces such as walls and ceilings	takes longer to apply and set up than other systems	clean water	use right proportions and mix well	fire resistant	gypsum board
		moisture will damage it	gypsum	be sure to apply a good, level brown coat	good insulation	metal lath
		needs warm temperature	lime	proportions change for different parts of country and time of year	many textures	prepared masonry
			other admixtures may also be used		crack resistant	wood lath
					many variations possible to meet different needs	

PLASTER SYSTEMS CHART

System	Where Used	Limitations	Made Of	Important Points	Advantages	Bases
Veneer Plaster	interior surfaces * * * * * * * special "thin coat" available	sets very fast * * * * * * * if mixed too long, will start to set too soon * * * * * * * needs warm temperature	special pre-mixed plaster compound * * * * * * * clean water	tape joints properly * * * * * * * follow manufacturer's directions carefully * * * * * * * time how long it takes to apply carefully (setting time usually 40 to 60 minutes	time saving (can finish a job in one day and paint 24 hours later) * * * * * * * can be used with radiant heat systems * * * * * * * mixes easily * * * * * * * can be troweled smooth or lightly textured	special gypsum board * * * * * * * use bonding agent for other surfaces

PLASTER SYSTEMS CHART

System	Where Used	Limitations	Made Of	Important Points	Advantages	Bases
Stucco (Portland Cement Plaster)	exterior surfaces	curing takes longer and needs special care	clean water	moist cure: keep damp until setting and hardening occur	fire resistant	metal lath
	* * * * * * *	* * * * * * *	* * * * * * *	* * * * * * *	* * * * * * *	* * * * * * *
	interior surfaces where moisture may be present	do not use over gypsum lath or gypsum plaster	cement (different kinds)	keep water from getting behind it	durable	masonry
		* * * * * * *	* * * * * * *	* * * * * * *	* * * * * * *	* * * * * * *
		special care needed to apply in freezing weather	sand or other aggregate	no frost in base surface	resists weather	concrete
			* * * * * * *	* * * * * * *	* * * * * * *	* * * * * * *
			different kinds of admixtures	wood framing must be rigid and strong enough to support stucco or it will crack	gets stronger as it ages	old stucco
						* * * * * * *
						use bonding agent as needed

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. Never apply ______________ over a ______________ that is ______________, ______________ or ______________.

2. When installing ______________ lath, it is important to ______________ it ______________ between the supports.

3. Some plaster is for ______________ use only because ______________ or moisture will ______________ it.

4. The outer layers of the ______________ covering gypsum panel board ______________ moisture.

5. In the 3-step gypsum plaster system, the names of the coats are ______________ coat, ______________ coat and ______________ coat.

6. Any plaster material with ______________ in it cannot be used with ______________ board.

7. The base material that supports the ______________ must always be ______________ and ______________ than the ______________ itself.

8. List the three basic kinds of plaster systems and where each kind may be used.

USE THE PLASTER SYSTEMS CHART TO ANSWER THE FOLLOWING QUESTIONS.

9. Name one advantage of each kind of plaster system that is not shared with other plaster systems.

10. How many of the systems can be used inside and outside?
1 2 3 (circle one)

11. How many of the systems are affected by temperature?
1 2 3 (circle one)

12. How many of the systems can be put on a gypsum base?
1 2 3 (circle one)

Self Assessment Answers

1. plaster, surface, painted, dirty, sooty
2. metal, stretch, tight
3. inside, water, damage
4. paper, absorb
5. scratch, brown, finish
6. lime, plaster
7. plaster, harder, stronger, plaster
8. gypsum--interior
   veneer--interior, thin coat for exterior
   stucco--exterior
9. gypsum--many variations possible
   stucco--resists weather
   veneer--time-saving
10. 2
11. 3
12. 2

Assignment

USE THE PLASTER SYSTEMS CHART TO ANSWER THE FOLLOWING QUESTIONS.

1. How are stucco and gypsum plaster systems different?

2. How are gypsum plaster and veneer plaster systems different?

3. How are all three of the systems the same?

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ The base material for plaster needs to be stronger and harder than the plaster.

2. ____ When metal lath is installed outside, wood or metal surfaces need to be covered with waterproof paper.

3. ____ Some kinds of gypsum board make good insulation for sound.

4. ____ A plaster system with lime in it has to be used over gypsum board.

5. ____ Metal lath has to be at least 1/4 inch away from its support.

6. ____ Some bases for gypsum 2 or 3 coat plaster systems are gypsum board, wood lath, metal lath.

7. ____ There are only 3 basic kinds of plaster systems.

8. ____ When adding water to any plaster, make sure it is clean water.

9. ____ Some water seepage behind plaster is all right.

10. ____ Gypsum plaster and veneer plaster are applied differently and made differently.

11. ____ Veneer plaster sets very slowly.

12. ____ Stucco systems can be applied to masonry and metal lath, but not to old stucco.

13. ____ Slack in metal lath is taken up when plaster is put on, so some slack is all right.

14. ____ The plasterer also works with fiberglass and acrylic systems that are applied like plaster.

15. ____ Metal lath can be used in more ways than any other kind of lathing material.

16. ____ All plaster systems need 3 coats: Scratch coat, brown coat, finish coat.

17. ____ The 2 most common lathing materials are gypsum board and metal lath.

18. ____ Veneer systems can use the same bases as gypsum 2 or 3 coat systems without any special preparations.

19. ____ Gypsum board does not burn easily.

20. ____ All plaster systems are waterproof after they are dry.

Instructor Post Assessment Answers

1. T
2. T
3. T
4. F
5. T
6. T
7. T
8. T
9. F
10. T
11. F
12. F
13. F
14. T
15. T
16. F
17. T
18. F
19. T
20. F

BASIC LATHING MATERIALS AND TECHNIQUES

Goal:

The student will be able to explain basic lathing techniques and will demonstrate them.

Performance Indicators:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Vocabulary section. Vocabulary words are important for a good understanding of the trade. After you have studied the vocabulary, ask your teacher to quiz you on the words and their meanings.

4. ____ Study the Information section. This section will give you the information you need to understand the subject.

5. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

6. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

7. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

Lath is a base on which a plaster system is applied. The lath can be either metal screen or gypsum board. It makes a strong, rigid surface on which to put the plaster material. As a plasterer, you will be responsible for putting plaster on lath. To do this correctly, you also have to know about the correct way to install lath. This module will give you experience in installing lath.

Vocabulary

Trade terms are very important for a good understanding of the trade. Study these words and meanings. When you have learned them, ask your teacher to quiz you on the words and their meanings.

ABUTTING--Two things that are placed close together, usually with ends or edges touching.

PLASTER SYSTEM--The total of all processes, techniques, materials and tools needed to apply a particular type of plaster material, such as veneer, stucco, 3-coat gypsum, etc.

Supplementary References

1. Drywall Taping Workbook. California State Department of Education. 1972. pp. 83-87.

2. Incentive Apprenticeship Training for Plasterers. National Association of Home Builders. 1979. Unit 4, "Materials II and Bases." pp. 24-33.

Information

Some plasters can be applied directly to concrete or masonry surfaces. But these surfaces, and other surfaces as well, are often covered with something that has been made for plaster. The things made to cover a surface before plaster is put on are called lath.

Lath can also be used as the foundation for a frame wall. A stud frame can be covered with either board or metal lath. After the lath is installed, then plaster is put on the lath.

METAL LATH

Metal lath is a wire screen that is stretched tight on supports to make a base for plaster. It can also be used to reinforce (make something stronger) stress points on board lath such as the corners above a door.

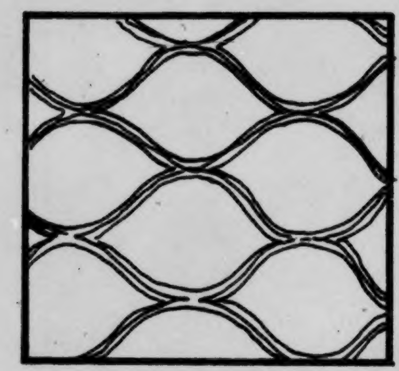
Metal lath can be used by itself as the base on which a plaster wall is made. Any kind of plaster can be put on metal lath. The plaster is applied so that it sticks (keys) in the holes of the metal with what is called a mechanical bond. Some types of metal lath have a sheet of paper or plastic attached. This sheet helps keep plaster from going through the holes and falling down. (This reduces waste.)

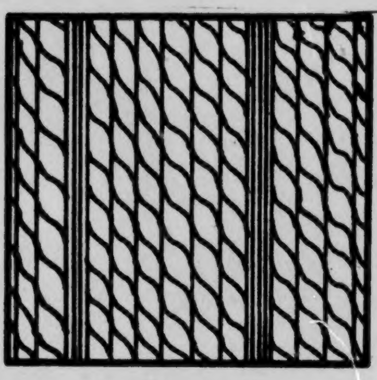
Installing Metal Lath

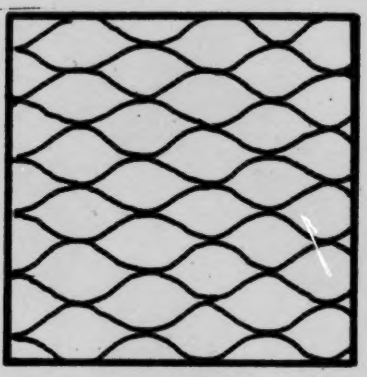
1. Apply so that the longest dimension goes across the supports.
2. Stagger end joints between courses.
3. Self-furring types (such as Riblath):
    a. Put rib against supports.
    b. Lap by nesting the outside ribs.

4. When lapping:
   a. Lap ends at least 1 inch.
   b. Lap sides at least 1/2 inch.
5. If an end lap comes between the supports, the lath will have to be lapped and tied with 18 guage tie wire.
6. Fasten the lath to supports at least every 6 inches.
7. End laps should be wire-tied.
8. For interior angles:
   a. Form lath into a corner.
   b. Carry the lath out to an abutting surface.

Types of Metal Lath


EXPANDED METAL STUCCOLATH


"RIBLATH"


DIAMOND MESH

BOARD LATH

Board lath can be any of several different types of gypsum board. Gypsum board lath comes in different sizes (lengths and widths) and different thicknesses. There are also special types of gypsum board that are used just for veneer plaster work.

Gypsum board lath is made with a solid core (or center) of gypsum. This solid core is a slab of hard gypsum that is wrapped with one or more layers of special paper. Some board lath is made with holes (perforated) in the paper. This makes a better surface for holding the plaster. Some board lath is made to give better insulation. Other kinds of board lath can make a vapor barrier or increase fire safety.

Insulation board lath is a special kind that is made to be used with special exterior insulation systems such as the Dryvit, Cota and Compo-Settef systems. The core that is used to make this kind of board lath may be a foam or other plastic instead of gypsum.

Plasters containing lime are not recommended for use with any gypsum board lath product. Usually, the manufacturer of each type of board lath will have recommendations as to which plaster systems should be used with their product. It is important to read any such manufacturer's recommendations before beginning the job.

Cutting Board Lath

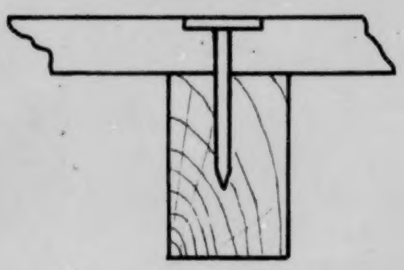
The most common tool for cutting board lath is the utility knife with a replaceable blade. It is important that the blade be kept sharp. A sharp blade is needed to prevent tearing the paper covering the core material of the board lath. To help make sure you get a clean and straight cut, use a straightedge to guide the blade when the cut is being made. The following are general rules for cutting different kinds of board lath:

1. Score paper on one side, cutting through all the layers of paper covering the core.
2. Snap the gypsum core by pushing on both sides of the scored line. Push the two parts on each side of the scored line toward each other to snap the gypsum core.
3. Cut the back paper layers.
4. Smooth the cut edges with a rasp, coarse sand paper or a piece of metal lath stapled around a wood block.

General Rules For Installing Board Lath

1. Ceiling board are often installed first.
2. Boards that have been cut to fit should fit easily into place. They should not have to be forced to fit. All joints should be loosely butted.
3. Tapered or wrapped edges are placed next to each other when board lath is fitted.
4. Never place a butt end or cut edge next to a tapered or rounded edge.
5. Stagger butt joints. Make these joints as far as possible from the center of walls and ceiling.

6. When it is possible, always support all ends and edges of board lath on framing members.
7. In most cases, placing board lath panels perpendicular to the framing is better than parallel placement.
8. FOR VENEER PLASTER: When nailing board lath that will be used with veneer plaster, do not dimple the nails. Set the nailhead flush with the base surface.



The Right Way

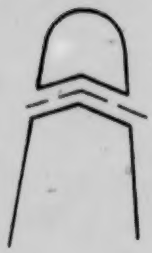
9. When pounding nails, do not break the paper or crush the core at the nailhead.
10. Position nails at least 3/8" from all ends and edges.

Installing Board Lath with an Adhesive

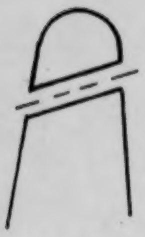
When an adhesive is used to install board lath, fewer or no nails will be needed. Adhesive should be applied in a continuous bead to the face of the wood framing. The nozzle on the squeeze bottle is cut differently for installing board lath on a wall surface than for installing on a ceiling surface. (See the illustrations on the following page.)

Advantages of Adhesives

1. Will use up to 75% fewer fasteners.
2. Stronger than nails alone.
   a. Up to 100% more tensile strength.
   b. Up to 50% more shear strength.



Cut Tip like this for Walls



Cut Tip like this for Ceilings

3. Not affected by moisture, high or low temperature.
4. Resistant to rodents and other vermin.
5. There are less problems with any fasteners coming loose.
6. Can bridge minor framing problems.
7. Will not stain or bleed through most finishes.

NOTE: Before applying, read the manufacturer's directions. Carefully follow application directions and safety precautions.

FURRING

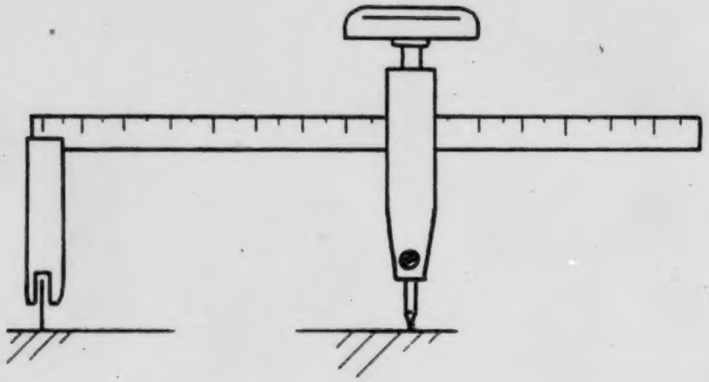
Furring is used to keep surfacing material away from the framing or old wall material. Furring can be used to level an uneven or damaged surface. It can be made with wood strips or special metal framework such as Trussteel. As a general rule, wood strips which are used for furring should be at least 2" X 2".

Furring is also used to make an insulation space or to allow room for a moisture barrier. For example, a moisture barrier or an insulation layer may be needed when an interior wall is installed over a masonry exterior wall.

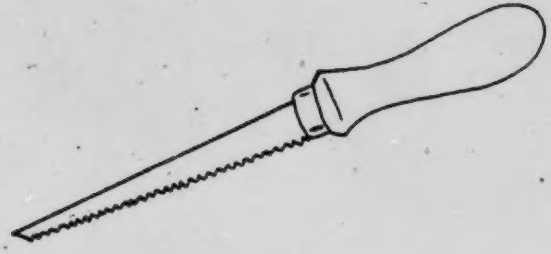
If metal furring is used, then the board lath will have to be installed with screws. Metal lath can be installed on metal furring by fastening with 18 guage tie wire. There are also clips that can be applied with a special gun (e.g., Trussteel Studs and Super-Tite Clips) which can be used to install metal lath.

If wood furring is used, then metal lath should be installed with fasteners that engage (or cover) two strands (or a rib on the "self-furring" type of metal lath) and the fastener should penetrate the wood at least 3/4 inch. Board lath can be installed on wood furring with screws or nails.

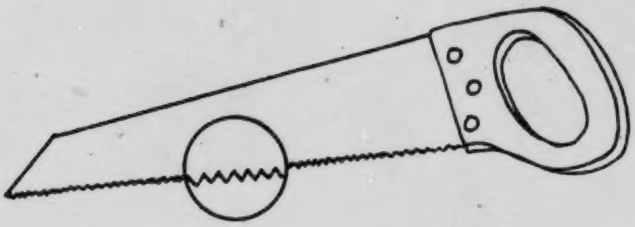
COMMON LATHING TOOLS



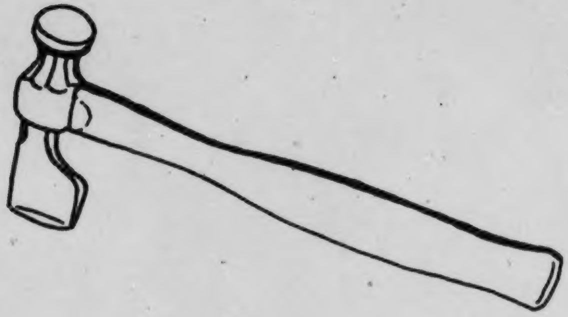
The CIRCLE CUTTER can cut a circle up to 16 inches in diameter.



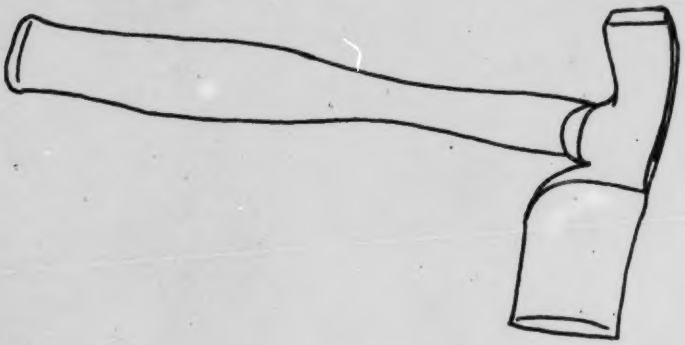
The UTILITY SAW is a type of keyhole saw. It can be used to cut small holes and to make cuts with odd shapes.



The DRYWALL SAW has a sharp point and a stiff blade. This makes it easier to punch the saw through board lath to start a cut. A short blade and coarse teeth make it easy to use for cutting gypsum board.



The DRYWALL HAMMER has a curved striking surface or "face." The convex face of the hammer is made so that it will leave the right kind of "dimple" in the gypsum panel. This type of hammer should not be used for installing veneer base lathing--use a hammer with a flatter face. The blade end of the drywall hammer is used to wedge or pry board lath. The blade end is not used for cutting.



The LATHER'S HATCHET is a general purpose tool. This is the standard tool used for nailing and cutting. The hatchet may have either a fixed (can't be taken off) or a removeable knife edge. The knife edge should always be kept sharp. A dull cutting edge will tear the paper covering on board lath.

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. Plasters with ______________ in them should not be used with gypsum board lath.

2. When applying metal lath, the ______________ dimension goes across the supports.

3. The dry wall saw has a ______________ point and a ______________ blade.

4. Metal lath is a ______________ screen that is stretched tight on __________ to make a base for ______________.

5. Gypsum board lath comes in different ______________ and different ______________.

6. When an adhesive is used to install board lath, fewer or no ______________ will be needed.

7. Lath can be used as the ______________ for a frame wall.

8. Metal lath can be tied with ______________ guage tie wire.

9. Furring can be made with ______________ strips or special ______________ framework.

10. Some types of metal lath have a ______________ of ______________ or ______________ attached.

11. Insulation board lath may have a core of ______________ or ______________ instead of ______________.

12. Lap the ends of metal lath at least ______________ inch and the sides at least ______________ inch.

13. The drywall hammer has a ______________ striking face.

14. Most board lath adhesives are not affected by ______________, high or low ______________.

15. Fasten metal lath to supports at least every ______________ inches.

Self Assessment Answers

1. lime
2. longest
3. sharp, stiff
4. wire, supports, plaster
5. sizes, thicknesses
6. nails
7. foundation
8. 18
9. wood, metal
10. sheet, paper, plastic
11. foam, plastic, gypsum
12. one, 1/2
13. curved
14. moisture, temperature
15. 6

Job Sheet

COMPLETE THE FOLLOWING TASKS.

Materials: Metal lath and board lath. Materials and equipment needed to install them.

1. Install at least 15 feet of metal lath, making at least one corner:
    a. On concrete or brickwork.
    b. On a stud frame.
2. Install a ceiling of board lath.
3. Install at least 12 feet of board lath, making at least one corner:
    a. On a stud frame using nails.
    b. On a stud frame using adhesives and nails.
    c. On concrete or brickwork with an insulation space and using screws.

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ Ceiling lath boards are often installed first.

2. ____ Adhesives will not stain or bleed through most finishes.

3. ____ A stud frame can be covered with metal lath but not with board lath.

4. ____ When nailing board lath for use with a veneer plaster system, the nails should be set with a dimple in the board.

5. ____ If metal furring is used, board lath is installed with adhesive.

6. ____ Plasters with lime in them should not be put on metal lath.

7. ____ Adhesive for board lath should be applied in a row of dots.

8. ____ Board lath can only be used in a very few ways.

9. ____ Furring can be used to make a space for insulation or a moisture barrier.

10. ____ Metal lath can be used to make stress points on board lath stronger.

11. ____ Wood strips used for furring must be at least 2" X 2".

12. ____ Some board lath is made with holes in the paper covering the gypsum core.

13. ____ Nails in board lath should be at least 3/8" from all ends and edges.

14. ____ Tapered or wrapped edges of board lath should be placed next to each other when the pieces are installed.

15. ____ With self-furring metal lath, the rib of the lath goes against the supports.

Instructor Post Assessment Answers

1. T
2. T
3. F
4. F
5. F
6. F
7. F
8. F
9. T
10. T
11. T
12. T
13. T
14. T
15. T

PREPARING COMMON SURFACES FOR PLASTERING

Goal:

The student will understand the tasks which must be done to prepare common surfaces for receiving plaster materials and will execute them.

Performance Indicators:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Information section. This section will give you the information you need to understand the subject.

4. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

5. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

6. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

If a surface is not prepared properly for plaster, the plaster may fall off. Most likely, it will fall off or go soft in some places and not in others. Then you will have to scrape off everything and start all over.

The most important thing in preparing a surface is to make sure that there is the right amount of suction for the amount of water in the plaster. Suction is what pulls the plaster to the base material while the plaster is setting. The suction is made by the base material pulling water out of the plaster.

You will have to learn how to time this. You will have to make sure that, when the plaster finally sets, just the right amount of water has been pulled out. This module will give you information and experience to prepare common surfaces properly for plastering.

Supplementary References

1. Incentive Apprenticeship Training for Plasterers. National Association of Home Builders. 1979. Unit 4, "Materials II and Bases." pp. 29-33. Unit 12, "Drywall and Veneer Base, Hanging and Finishing." pp. 1-15.

2. Drywall Taping Workbook. California State Department of Education. 1972. pp. 103-122.

Information

PREPARING CONCRETE FOR GYPSUM PLASTER OR STUCCO

There are several different things that can be done to prepare these surfaces for plaster or stucco. The important thing is to make a surface to which the plaster material can stick. The main ways of making this kind of surface are:

1. Make a "mechanical key." This is a rough surface on to which the plaster material can "lock." It can be made by roughing or scoring the concrete surface. Be sure to clean the surface very well after it has been roughened.
2. Apply a liquid bonding agent. With these products, it is very important that the manufacturer's recommendations be followed. Bonding agents may make what is called a "low-suction" base. This means the plaster mix will have to be proportioned to suit the condition.
3. Attach metal lath with power-driven fasteners.

PREPARING CONCRETE FOR STUCCO

The methods talked about above can be used for either gypsum or stucco plaster that will be put on concrete. The following are things that should be done to a concrete surface only if the plaster material is stucco plaster.

1. Acid wash can be done but it is not usually recommended. This is because the directions have to be followed very carefully. Also you have to be sure that all of the acid is removed before applying the plaster. This can be done by checking with litmus paper or some similar method.
2. Dash coating means to dash or whip on a thin coat of a soupy plaster with a brush. Most commonly a one-to-one (1:1) mix by volume of cement and sand is used. The mix is allowed to cure until it is hard. It should be wet with a fine mist spray to keep it moist until it has cured.

MASONRY

Experience and testing will help you learn how to tell the need for water. Water is put on masonry to keep it from pulling water out of the plaster mix before the mix has a chance to harden. A base that is very dry needs to have some water added to it to stop this extreme suction.

The water should be sprayed on ahead of time. This will let it have time to be drawn into the masonry. Then the plaster can be safely applied.

If any masonry surface is not firm, if it has started to crumble or has gone soft, do not apply plaster to the surface. A lath base must be used to cover this type of surface. Also, all joints should be flush when working with masonry units.

Preparing Medium Suction Masonry

This kind of surface usually takes out "just the right amount" of water from the plaster mix. In other words, it does not pull out too much water before the plaster has set, and it does not pull out too little water before the plaster has set.

The recommended plaster mix is 1 part cementing material (either gypsum or stucco) to 3 parts aggregate. This is usually written as 1:3. Unless the weather is very hot and dry, this mix should spread easily without having to wet the surface first. The main kinds of medium suction masonry materials are:

Cement and cinder block
Face or medium hard brick
Medium hard clay partition tile
Some better grades of common brick
Many forms of soft stone

Preparing High Suction Masonry

This kind of surface will often pull too much water, too quickly, out of the plaster mix. This means the mix will not be able to set properly and will end up as a poor plastering job.

Plaster for a high suction surface has to be mixed "poor." This means more aggregate should be used. A mix of 1:3-1/2 is often recommended.

A coarse sand will take up more water than a smooth sand. So it is often wise to make sure you use a coarse sand as the aggregate. The extra water can then be absorbed into the high suction base. A trial run is recommended. If you use more water than you really need, this can make a weak plaster. Getting the right amount of water is a big problem with stucco.

The plaster material is usually applied in two coats, one right after the other. Try to work small areas and be sure to rod and darby the work as soon as you can. The high suction can prevent the proper straightening of the work.

Gypsum partition tile has a very high suction. You will need a very poor mix that uses a sharp (angular) sand when working on this material. The main kinds of high suction masonry materials are:

Soft common brick
Soft clay partition tile
Gypsum partition tile
Some tile made with highly porous materials

Preparing Low Suction Masonry

This kind of surface pulls very little water out of the plaster mix. A "rich" mix is recommended. This is often a 1:2 mix.

The plaster mix should be scratched on and allowed to set. The low suction means it is easy to break the bond between the plaster and the base to which it has been applied. So do as little as possible to disturb the plaster while applying and scratching it.

Applying the plaster by machine works well with a low suction base. The joints of all masonry should be flush before applying plaster, but this is extra important with low suction masonry. The main kinds of low suction masonry materials are:

Glazed tile
Hard burnt brick (such as road brick)
Hard stones (such as granite)

Preparing for Interior Gypsum Plasters Bonded Directly to Exterior Masonry Walls

This is not recommended. If it is done at all, the wall should first be waterproofed. The main reasons for this are:

1. Water can come through the wall and damage the interior plaster.
2. Heat loss can be high through masonry with direct plastering.
   a. Summer heat comes through the wall.
   b. In winter, interior heat goes out through the wall.
3. These walls are subject to moisture condensation that can damage the interior plaster.

It is recommended that an exterior masonry wall be furred out at least one inch to make an air space between the lath and the masonry wall. If possible, it is recommended that an insulated gypsum board be used.

PREPARING VENEER PLASTERING BASES

This is usually a special kind of board lath. The paper covering the gypsum core is often specially treated for a veneer plaster system. Because of this special treatment, it is important that veneer board lath not be damaged in any way. If it does get damaged, the damaged area has to be repaired before applying the veneer plaster.

Each manufacturer will have special directions. But the general procedures of preparing veneer board lath are:

1. Joints have to be taped with a glass fiber tape or a paper tape with a special setting compound.
2. All end joints must be firmly supported.
3. Joints need to be staggered so that they occur on different framing members.
4. If the gypsum base paper is damaged:
   a. Repair with quick setting plaster.
   b. Finish with a bonding agent before applying the veneer.
5. If the veneer base has been wetted and stained, use a bonding agent over the stain.
6. Don't overlap taped joints. This can lead to cracking, especially when using glass fiber tape.

Some veneers can be applied directly to masonry. You will need to check the manufacturer's recommendations to find out if this is so, and what to do.

Veneer may also be applied to concrete block or to concrete if the manufacturer's directions are followed. If the concrete block does not have good suction, it will have to be scored to make a good mechanical bond. Concrete should be coated with a bonding agent. A 2-coat veneer system is recommended for both concrete and concrete block.

NOTE: Some of the following general procedures for taping regular gypsum board lath may also apply to taping veneer lath. Be sure to read the specific manufacturer's recommendations.

PREPARING BOARD LATH BY TAPING

Most joint cements do not "set" in the way that a plaster mix does. Joint cements are adhesives that dry, so temperature, humidity and ventilation are very important. The temperature should not go below 50° F, with drafts, the cement will dry too fast. This can make the cement shrink more than it should and make problems with the tape that is used. With good drying conditions, most cements take about 24 hours to dry.

One type of joint cement is used to embed and coat the tape. A second type is used for finishing. Be sure to follow the manufacturer's mixing directions.

Add the powder to the water. Mix for several minutes to make sure it is all uniformly mixed. Let it soak for about 30 minutes. Then stir to get a creamy, workable mix. It may have to be soaked longer than 30 minutes during cold weather.

1. Check for loose nails and loose boards. Cracks and damaged areas should be patched with drywall compound (and tape, if it is needed) at least 24 hours before the joint taping is started.
2. Apply first coat of cement into the channel made by the tapered board edges, or over the butt edges of end joints. Apply the cement evenly with a drywall trowel. Avoid overfilling. Make sure there is enough cement to give the tape a good bond.
3. Apply tape over the center of the joint. Make sure the paper is centered, straight and not wrinkled or buckled.
4. Press tape into joint cement with a trowel. Use enough pressure to remove any excess cement.

5. Apply a thin coat of cement over the tape as soon as it is in place. Fill any recesses between the tapered edges of the tape and the board surface.

   NOTE: Blisters may appear under the tape. If trowelling does not force out the air, puncture the blister with a sharp object. Blisters are caused by not applying enough cement before the tape is put on.

6. Allow to dry. This will take about 24 hours under good drying conditions.
7. Lightly sand the first coat.
8. Apply second coat and feather out about 2 inches past the edges of the first coat. For butt joints, the second coat should go out a bit more.
9. Let the second coat dry.
10. Lightly sand after it has dried. Be careful not to sand the paper of the board lath. Too much sanding on the paper will raise a nap on it.
11. The third coat is applied with finish cement. It should be feathered out about 2 inches beyond the edges of the second coat.
12. Let the third coat dry, then sand it.

NOTES: 1. Coat the nailheads with cement each time cement is applied to the joints.

2. There are embedding compounds that go under the tape, all-purpose compounds and finishing compounds. The first or second types can be used as a first coat, but the finishing compound should not be used as a first coat.

Inside Corners

Cover both sides of an inside joint with cement. Fold the tape down the center mark. Press the folded tape into the angle with a corner trowel. Remove any excess cement. Drying and sanding are the same as for joints.

Outside Corners

Apply metal corner bead. Apply three coats of joint cement, drying and sanding between coats. Feather out at least 10 inches from the edge of the corner bead. This will get rid of hollow spots.

Setting Compounds

There are also special mixes that "set" rather than dry. They can get very hard, may be difficult to sand, and are often waterproof. They get hard quicker than the drying cement types and do not shrink as much. Each brand is different, so be sure to check what the manufacturer says about the one you may be using. The water-resistant types can be used on the exterior with special gypsum board. With these special setting compounds, it may be possible to finish a wall in one day.

CHART OF COMMON PROBLEMS

Problem	Source: I	F	T
Damaged board end	X		
Board not fitted properly	X		
Surface fracture after installed	X	X	
Frame member out of alignment		X	
Board surface punctured by a fastener	X	X	
Loose board	X	X	
Water damaged board	X		
Torn paper face	X		
Twisted frame member		X	
Warped frame member		X	
Tape blisters			X
Edge cracking			X
Ridging or beading	X	X	X
Starved joint			X
Raised nap on board paper			X
Inside corner cracks	X	X	X
High joints or crowns		X	X
Excessive shrinking			X
Nail pops	X	X	X

I - Installation
F - Framing
T - Taping

An "X" indicates a possible source of the problem.

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. Interior gypsum plasters should not be directly bonded to ______________ masonry walls.

2. An ______________ wash is one way to prepare concrete for stucco plaster.

3. Too much sanding on board lath will raise the ______________ of the paper.

4. If the veneer base has been wetted and stained, use a ______________ ______________ over the stain.

5. Each coat of joint cement has to be ______________ before the next coat is applied.

6. Experience and testing will help you learn how to tell the need for ______________.

7. Concrete can be prepared for gypsum plaster or concrete by making a ______________ key, applying a liquid ______________ ______________ or by attaching ______________ ______________.

8. The paper of ______________ gypsum board lath is often specially treated.

9. The last coat of joint cement is a ______________ cement.

10. The tape is troweled into the ______________ coat of joint cement.

11. Most joint cements are adhesives that ______________ instead of set.

12. High suction masonry will pull too ______________ water out of the plaster.

13. Low suction masonry will pull too ______________ water out of the plaster.

14. ______________ can be put on masonry to keep the base from pulling ______________ out of the plaster too fast.

15. Applying the plaster by machine works well with ______________ suction masonry.

16. Usually, a total of ______________ coats of joint cement are applied.

17. Most joint cements take about ______________ hours to dry.

18. If the masonry surface is not firm, it will have to be covered with a ______________ material.

19. When working on a high suction masonry, work ______________ areas.

20. A dash coating to prepare concrete for stucco can be made with a 1:1 mix by volume of ______________ and ______________.

Self Assessment Answers

1. exterior
2. acid
3. nap
4. bonding agent
5. sanded
6. water
7. mechanical, bonding agent, metal lath
8. veneer
9. finish
10. first
11. dry
12. much
13. little
14. water, water
15. low
16. three
17. 24
18. lath
19. small
20. cement, sand

Job Sheet

COMPLETE THE FOLLOWING TASKS.

Materials and Tools
concrete slab
scarring tool
liquid bonding agent
board lath for taping
tape
taping cement

1. Prepare a concrete surface by:
   a. Making a mechanical key.
   b. Applying a liquid bonding agent.

2. Tape board lath which has at least 2 joints, 1 outside corner and 1 inside corner.

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

!. ____ A 1:2 proportion of cementing material and aggregate is usually good for high suction masonry.

2. ____ A 2-coat veneer system is recommended for both concrete and concrete block.

3. ____ A liquid bonding agent can be used on concrete to prepare it for gypsum plaster or stucco.

4. ____ Each coat of joint cement should be feathered out about 2 inches farther than the previous coat.

5. ____ When preparing board lath for veneer plaster, the joints have to be taped with a glass fiber tape or paper tape in a special setting compound.

6. ____ The first coat of joint cement fills up the channel made by the tapered board edges.

7. ____ Dash coating can be used to prepare concrete for gypsum plaster or stucco.

8. ____ Veneer plasters are commonly put on all kinds of board lath.

9. ____ A 1:3 proportion of cementing material and aggregate is usually good for medium suction masonry.

10. ____ Only the first 2 coats of joint cement are sanded.

11. ____ Most joint cements do no "set" but dry instead.

12. ____ Water is put on masonry to keep it from pulling too much water out of the plaster.

13. ____ A coarse sand will take up more water than a smooth sand.

14. ____ The joints of all masonry units should be flush before applying plaster.

15. ____ A medium suction masonry usually does not pull too much water out of the plaster.

16. ____ For outside corners, the coats of joint cement should be feathered out at least 10 inches from the edge of the corner bead.

17. ____ If nothing else is available, it is okay to use a finishing joint cement to embed the tape.

18. ____ If an exterior masonry wall has been waterproofed, do not bond an interior gypsum plaster to it.

19. ____ If a masonry surface has started to crumble, then only stucco can be put on it.

20. ____ A rich mix is recommended for low suction masonry.

Instructor Post Assessment Answers

1. F
2. T
3. T
4. T
5. T
6. T
7. F
8. F
9. T
10. F
11. T
12. T
13. T
14. T
15. T
16. T
17. F
18. F
19. F
20. T

AGGREGATES AND ADMIXTURES

Goal:

The student will be able to identify and explain the use and characteristics of additives to plaster materials and explain when and why they are used.

Performance Indicators:

The student will successfully complete a Self Assessment, an Assignment and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Vocabulary section. Vocabulary words are important for a good understanding of the trade. After you have studied the vocabulary, ask your teacher to quiz you on the words and their meanings.

4. ____ Study the Information section. This section will give you the information you need to understand the subject.

5. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

6. ____ Do the Assignment page. Follow the instructions at the top of the Assignment page.

7. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

Plaster materials sometimes have to be changed. If the weather is hot, it might be necessary to make the plaster set faster. The plaster may need to be stronger. These things, and more, are done by adding aggregates and admixtures.

There are no "trick" ways to make a plaster mix work differently. The changes are made by adding things in measured amounts. Adding too much--or adding too little--will keep things from working right. This module will help you learn about what to add to make the right thing happen.

Vocabulary

Trade terms are very important for good understanding of the trade. Study these words and meanings. When you have learned them, ask your teacher to quiz you on the words and their meanings.

SET--When plaster gets hard. It is not the same as when plaster gets dry. Plaster should set before it gets dry.

CHECK CRACKING--Short cracks that look like dried or cracked mud.

READY-MIX--A pre-mixed compound. Only clean water has to be added.

SPECIAL EARTHS--Clays with special properties.

Supplementary References

1. "Unit 7: Materials." Incentive Apprenticeship Training for Plasterers. National Association of Homebuilders, 1979. pp. 1-7.

2. Van Den Branden, F. and T. Hartsell. Plastering Skills and Practice. 1971. pp. 117-32, 297-304.

Information

Aggregates and admixtures are used to change a plaster mix. They can change the appearance of the final product. They can change the set time or the qualities of the plaster.

Aggregates

An aggregate mixed with a plaster material makes it stronger and harder. It can give the plaster material more body and help keep it from check cracking. The two most common lightweight aggregates are vermiculite and perlite. They add more fire resistance to the plaster than does sand. When plaster is exposed to a high heat, they keep water from boiling away better than sand. MAIN AGGREGATES: Sand, vermiculite, perlite.

Admixtures

A plaster mix has:

1. An aggregate.
2. A cementing material for a binder.
3. Water.

Other things added to a plaster mix are called admixtures. Things are added to change the plaster mix in some way: To make it set faster or slower, to change the color, etc. Before adding something, check the manufacturer's recommendations for how, when and where to add it.

Admixtures are often mixed with the water before the water is added to the plaster. They are often used when a base is dry, or if the finish coat will be very thick. The basic admixtures are:

1. Accelerators.
2. Retarders.
3. Strengtheners.
4. Plasticizers.

5. Water Repellents.
6. Air Entrainers.
7. Colors.

Admixtures can be added on the job. Many are already put into ready-mix plasters. If it is put into a ready-mix, all you have to add is the clean water.

Accelerators

They are used to make a plaster mix set faster. Weather conditions, the quality of the water or the aggregate used can slow down a set time.

Calcium chloride or soda may be used for stucco. But the best way to speed up stucco set is to preheat the water and the aggregate. Also keep it warm while it is setting.

A common accelerator is gypsum itself. If gypsum sets and then is added to a new mix, it will speed the set of the new mix. This is why it is so important to keep the equipment clean. Bits of dried plaster mix can change the set time of a new mix.

Retarders

Retarders will make a plaster mix set slower. Pure gypsum sets too fast for a lot of plastering work. So, a retarder is often added during the manufacture of gypsum plaster materials to slow down the set time to at least 4 hours. They can also be added on the job if they are needed. Gypsum plaster usually sets within 4 hours on a lath base. It will set faster over masonry or scratched-in work. Stucco sets so slowly a retarder is not usually needed. A working rule for deciding how slow the set time should be is: Mortar has to set before all of the water is gone.
SOME RETARDERS: Cream of tartar, gelatin, glue, ammonia, zinc sulphate, dextrine, gums, soap, starch, oil (animal or vegetable).

Strengtheners

Lime plasters usually need a fiber to make them stronger. Gypsum plasters do not; they are strong enough by themselves. A fiber can be added to the base coat for both gypsum and stucco when the base coat will be used to cover lath.

The fiber helps the plaster stick to the lath.

FIBERS: Hair and sisal (for strength), wood and glass (for bulk and better coverage).

Plasticizers

They are used to make hard-to-work mortars easier to apply. Be sure to follow the manufacturer's directions when using plasticizers. Do not add more to a mix that already has a plasticizer in it. Adding too much will reduce the strength of the mix.

SOME PLASTICIZERS: Lime, glass fiber, special earths.

Water Repellents

They can be added to stucco mixes to make the stucco repel water better. The amount that is added should not be more than 2% of the weight of the cement (2 pounds of admixture for each 100 pound of cement).

SOME WATER REPELLENTS: Ammonium stearate, aluminum stearate, butyl stearate emulsions (all are sold under various trade names).

Air Entrainers

They can be added to stucco. They make it easier to work the material, make it easier for the stucco to keep water in it, and make the stucco better able to resist freezing and thawing.

Colors

High-grade pigments can be added to stucco finish coats. Use only recommended materials and follow the manufacturer's directions.

For use over concrete and masonry:

1. Waterproof before starting. Moisture seeping through the concrete or masonry can stain the colored finish.
2. Best to let the base coats dry before putting on the finish coat.

For tile joined to colored stucco:

1. Wet the stucco with clean water up to 10 inches from the joint. This keeps the stucco from pulling colored water from the tile base.
2. Best to have the tile in place before applying colored stucco.

For molds and slow-drying materials:

1. Put molds in place before applying colored stucco.
2. Allow materials to dry out completely before applying the colored stucco.
3. Moisture pulled out of slow-drying materials can stain the colored stucco.

Veneers and Admixtures

1. Don't add anything unless the manufacturer recommends that it be added.
2. If an admixture is used, pre-mix it in clean water. Then add in a measured amount to the mixing water for each batch.
3. Alum is not a good accelerator. It makes a snap set (too fast). Do not use alum with a limestone aggregate. It will make a chemical reaction.

Keenes Cement and Admixtures

1. Adding hair or fiber to the scratch coat makes it more rigid. Use 2% by weight. Do not use if the mix has an accelerator in it.
2. Can be hardened by adding silica sand or fine marble dust. This also protects against shrinkage cracks. Use 5 or 6 scoops for each 100 pounds of Keenes cement.

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. An ______________ can give the plaster material more body.

2. The 2 most common lightweight aggregates are ______________ and ______________.

3. Air entrainers make stucco better able to resist ______________ and ______________.

4. Accelerators make a plaster mix ______________ faster.

5. Strengtheners make a plaster material ______________.

6. Always check the manufacturer's recommendations for ______________, ______________ and ______________ to add something.

7. Do not add more than ______________ pounds of water repellents for each ______________ pounds of cement.

8. A common accelerator is ______________ itself.

9. Gypsum plaster usually sets in ______________ on a lath base.

10. Water repellents can be added to ______________.

11. Bits of dried ______________ mix can change the ______________ ______________ of a new mix.

12. Admixtures are added to the ______________ first.

13. Plasticizers make a plaster material ______________ to apply.

14. _______________ make a plaster mix set slower.

15. Pigments add ______________ to a plaster mix.

Assignment

COMPLETE THE ASSIGNMENT BELOW.

Visit a supplier of plastering materials. Try to find at least 2 brands (or trade names) for each kind of admixture covered in this module. For one kind of admixture, read and compare the manufacturers' directions on how to use the two brands. Write a report to give to your instructor.

Accelerator	Comments
1. ______________	______________________________
2. ______________	______________________________
Retarder	
1. ______________	______________________________
2. ______________	______________________________
Strengthener	
1. ______________	______________________________
2. ______________	______________________________
Plasticizer	
1. ______________	______________________________
2. ______________	______________________________
Water Repellents	
1. ______________	______________________________
2. ______________	______________________________
Air Entrainer	
1. ______________	______________________________
2. ______________	______________________________

Color Pigments

1. ____________________ ____

2. ____________________ ____

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ Fibers can help a plaster mix stick to lath.
2. ____ All plaster mixes have admixtures in them.
3. ____ Silica sand as an admixture in Keenes cement will make it harder.
4. ____ Pure gypsum sets too fast for a lot of plastering work.
5. ____ Moisture pulled out of slow drying materials will not be bad for stucco with a color admixture.
6. ____ Plasticizers are made with plastic.
7. ____ Vermiculite and perlite add more fire resistance to plaster than sand.
8. ____ Tile should be put on before applying stucco with a color admixture.
9. ____ All admixtures can be used with veneer plasters.
10. ____ Cream of tartar is a retarder.
11. ____ Admixtures are often mixed with the water before the water is added to the plaster.
12. ____ Concrete should be water proofed before applying a stucco with a color admixture.

13. ____ Aggregates and admixtures don't change a plaster mix.

14. ____ Dried gypsum cannot be used to accelerate the set of stucco.

15. ____ Adding more plasticizer than needed will make a mix stronger.

16. ____ A retarder is an aggregate.

17. ____ Stucco resists freezing better if an air entraining admixture is added.

18. ____ Dried gypsum is not a very good accelerator.

19. ____ No more than 20 pounds of water repellent should be added for each 100 pounds of cement.

20. ____ Admixtures cannot be added on the job.

Instructor Post Assessment Answers

1. T
2. F
3. T
4. T
5. F
6. F
7. T
8. T
9. F
10. T
11. T
12. T
13. F
14. T
15. F
16. F
17. T
18. F
19. F
20. F

MATERIALS AND MIXING OF GYPSUM BASE COATS

Goal:

The student will be able to identify and explain the characteristics of materials used in common gypsum base coat plastering, including when the materials are used, how thick they are applied (to what tolerance) and will demonstrate knowledge by mixing materials to trade standard by hand and by machine.

Performance Indicators:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Information section. This section will give you the information you need to understand the subject.

4. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

5. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

6. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

In order to finish a job correctly, you have to start the job correctly. The base coats are the plaster materials applied before the finish coat. The base coats can be a scratch and a brown coat, or a brown coat only (when it is carefully straightened).

This module will help you learn how to mix these materials. It will also give you information you need in order to do the first step of making a professional job--getting started correctly.

Supplementary References

1. Plastering Skill and Practice. F. Van Den Branden. 1971. pp. 117-132.
2. Incentive Apprenticeship Training for Plasterers. "Unit 5: Applying the Base Coat." National Association of Home Builders. 1979. pp. 1-28.

Information

GYPSUM WITH SAND AGGREGATE

This is the most common base coat plaster mix. It is used where good sand is available. The mixing proportions may have to be changed a bit to meet different types of weather conditions: Hot, dry, windy, etc. The amount of suction of the base to which it is applied will also affect the mix proportions. It may be applied by hand or by machine.

Bases With Which It Is Used

Gypsum lath
Gypsum partition tile
Clay tile
Brick with moderate suction
Concrete block walls

Physical Properties

Fire resistant, with up to a 2 1/2-hour rating. Weight of a 1:2 mix is 100-115 pounds per cubic foot. Hardness is a rating of 2.

Mixing

There are 3 standard mixes, by volume they are (cement : aggregate):

1:2 --Scratch coat over all lath in 3-coat work.
1:2 1/2--Over gypsum lath in 2-coat work.
1:3 --Brown coat in 3-coat work (following the 1:2 scratch coat).
--All work that will be over masonry.

Gypsum mixed with sand aggregate can meet most requirements. However, if a high fire rating is needed, or the weight has to be reduced, another aggregate may work better.

GYPSUM WITH PERLITE AGGREGATE

Plasters made with perlite tend toward lesser strengths. So, it is important to follow the mixing proportions very carefully. This mix may be applied by hand or by machine. It is used where sand is unsuitable or if sand costs too much.

Bases With Which It Is Used

Same as gypsum/sand.

Physical Properties

Fire resistant, with up to a 4-hour rating. Weight of a 1:2 mix is 50-60 pounds per cubic foot. Hardness is a rating of 3.

Mixing

Do not use more than 2 cubic feet of perlite for each 100 pounds of gypsum. This applies to all types of plastering bases. EXCEPTIONS TO THIS ARE:

1. Masonry.
2. Brown coat in 3-coat work when the total thickness will be 1 inch or more.

For the 2 exceptions, the proportions should not be more than 3 cubic feet per 100 pounds of gypsum.

Gypsum with perlite aggregate is harder than when vermiculite is used. It is not as strong as gypsum/sand, but it does resist fire better than gypsum/sand. It may cost more, but it can be quicker to apply because it weighs less than gypsum/sand. Gypsum/perlite provides good insulation against heat loss.

GYPSUM WITH VERMICULITE AGGREGATE

Vermiculite and gypsum mixes are not as strong as similar mixes using sand or perlite. So it is important that all mixing instructions be followed carefully. A greater amount of mixing water is used. So greater care must be taken to make sure the excess water is able to evaporate. It may be applied by machine or by hand.

Bases With Which It Is Used

Same as gypsum/sand.

Physical Properties

Fire resistance is the same as perlite. Weight of a 1:2 mix is 50-55 pounds per cubic foot. Hardness is a bit softer than gypsum/perlite.

Mixing

Same as gypsum/perlite.

In many ways perlite and vermiculite make very similar mixes. Vermiculite will weigh a bit less than a perlite mix. But the perlite mix is harder.

GYPSUM WITH WOOD FIBER

This plaster material needs to have a good scratch coat applied first. Gypsum Wood-Fibered Plaster can be applied by hand or by machine.

Uses

Gypsum/wood fiber is often used for repairs, alterations and patching. It is sometimes used as a scratch coat when a sanded brown coat will be applied. May be a scratch coat for metal lath work.

Physical Properties

Fire resistance is 50% greater than gypsum/sand, but not as great as perlite or vermiculite mixed with gypsum. Hardness is greater than gypsum/sand plaster.

Mixing

It is mixed with water on the job. EXAMPLE: 65 pounds water per 100 pounds of plaster material.

The gypsum/wood fiber has greater strength than gypsum/sand mix.

GYPSUM READY MIX

This is a plaster material that has the aggregate premixed at the factory. Since it is mixed at the mill, it offers a great deal of quality control. Only water is added to the plaster mix. It may be applied by hand or by machine. The specific properties and uses of the gypsum ready mix plaster will depend on which aggregate has been added at the mill.

THICKNESS OF GYPSUM PLASTERS

The thickness of the finish coat is included in the overall thicknesses given. You should allow about 1/16 inch for the thickness of the finish coat. The total thickness will be between 1/2 inch and 7/8 inch in most cases.

Getting the proper thickness is important. Remember that a 1/2 inch thickness is about twice as strong in bending as a 3/8 inch thickness.

Thickness	Surface to be Plastered
3/8 to 1/2	Gypsum partition tile and most gypsum lath.
5/8"	Brick, clay tile, other masonry.
5/8"	Over the face of metal lath. From the back of the metal lath to the face of the finished plastering job will be about 3/4".

BASE COATS FOR GYPSUM AND STUCCO PLASTER

Surface	Surface Preparation	Techniques	Comments
Interior plastered with gypsum.	Using gypsum board lath.	2- or 3-coat (See note to the right.) Use 3-coat over 1. 1/2" gypsum lath with horizontal supports more than 16" apart. 2. Gypsum lath on ceilings where only edge clips are used. 3. 3/8" perforated gypsum lath on ceiling. In browning for 2-coat, large areas may be applied at one time. The lath does not have a lot of suction.	In 3-coat work, use a mix of 1:2 1/2 for the brown coat. This is because gypsum lath is so flexible. In 2-coat work, use a browning mix of 1:2. A rich plaster is needed for a good bond. In browning for 2-coat, apply 1/2" for browning. Cracking and failure are often caused by thinness.
Interior or Exterior	Apply over insulation board. May use metal lath, stucco, netting, etc., with insulation board.	2- or 3-coat. Gypsum plaster (interior) Stucco (interior or exterior).	Insulation board usually used for exterior. May be used for interior with lath.

Surface	Surface Preparation	Techniques	Comments
Interior or Exterior	Apply over metal lath.	3-coat typical. Gypsum plaster (interior). Stucco (exterior or interior).	Use galvanized metal lath for exterior. In 3-coat gypsum use 1:2 1/2 browning mix because lath is flexible. When applying plaster to metal lath, use light pressure. Use a stiff and rich plaster, possibly with fibers. Do not overlap strokes over metal lath. If fibers are used with stucco, they must be alkali resistant. Wire-cloth or woven wire lath needs a stiffer, more fibered plaster than diamond mesh metal lath. When using paper-backed metal lath, push the paper away so the plaster can get behind the metal for a good "key."
Fire-proofing an interior or exterior with light-weight aggregate.	Apply over metal lath.	Use 2- or 3-coat scratch and double-up. Omit finish or use same material as base.	

Surface	Surface Preparation	Techniques	Comments
Fireproofing an interior or an exterior with lightweight aggregate to be applied direct to steel or concrete.	No lath used. Spray direct to surface.	Use 2 or more coats. 1st coat a "flash" coat to get suction.	A factory mix, add only water. May be hand or machine applied.
Gypsum plaster on masonry.	Lath not usually needed except in weak areas such as openings, etc. Surface should be clean of grease, etc. Remove loose plaster, scaling, dust, etc. Surface may need roughing. High suction masonry may need dampening or mix change.	A 2-coat plaster is typical. Make poor mix for high suction masonry. 1:3 1/2 by volume is typical. Will need more water. Coarse sand is best. May also wet base ahead of time. Do not wet just before plastering. Let it soak awhile. Apply plaster in two coats, one right after the other. Work a small area. Mix rich for low suction bases. 1:2 mix is typical. With low suction bases, don't disturb the plaster after it is placed.	Bond is made by surface roughness or suction or both. To check for good suction, spray on water and see how it gets absorbed. Masonry with too much suction, should be dampened ahead of time. Do not make it too wet. Spray early enough so the water can be taken up before plastering starts. The entire wall has to be uniform in suction or else the finish may appear spotty. Do not apply gypsum plaster directly to the interior of exterior masonry walls. Moisture may come through. Furring strips may be used. Do not add more sand and water than needed. This will weaken the plaster.

Surface	Surface Preparation	Techniques	Comments
Stucco on masonry.	Lath not usually needed. Surface should be clean of grease, loose mortar, dust, scale, etc. Surface may need roughing.	2-coat plaster is typical. 1:3 mix is typical. Mix can be made "poorer" for high suction bases (using more sand and water) or richer for low suction bases. But it is often better to dampen the base instead of changing the mix. Too much water weakens the plaster. This leads to cracks.	If a good bond is doubtful, prepare masonry by 1. A dash coat (one part cement and from one to two parts sand by volume). 2. Use a bonding agent. 3. Use lath or other support.
Gypsum plaster on concrete.	Prepare concrete surface by roughening with sand-water blasting, using a bonding agent or other method. Should be free of grease. Use metal lath if thickness of plaster is greater than 3/8" on ceiling or 5/8" on walls.		Follow manufacturer's recommendations with bonding agents.

Surface	Surface Preparation	Techniques	Comments
Stucco on Concrete	Stucco may be applied directly to concrete. Surface roughening may be needed: sand-water blasting, bonding agent, dash coat, etc. Should be free of grease, etc.	2-coat method, 1:3 mix may be used. Another method: 1. Use bonding agent (or at least dampen the concrete) after it has been roughened. 2. Then apply only one coat of plaster. NOTE: Two coats may be used, but don't make the total thickness more than 3/8" in any case. Cure well.	Good preparation of the surface is very important.
Foam Plastic	Metal lath, chicken wire, or other lath recommended.	3 coats typical. Scratch Coat: 1. Apply 1/4" scratch coat with firm pressure. Then scratch and allow to dry firm and hard. 2. Apply regular leveling coat.	Scratch coat is required because of low suction of foam.

Surface	Surface Preparation	Techniques	Comments
Stucco or gypsum on a bituminous compound such as tar.	Walls should be "furred" out or metal lath applied direct to walls.	2- or 3-coat, depending on lath or other support stiffeners.	Do not apply gypsum plaster or stucco direct to bituminous, unless so specified.
Veneer plaster on wood, metal studs, etc.	May use special gypsum lath with special taping over most surfaces.	May use 1- or 2-coat technique.	Joint reinforcement with tape is important. Use glass fiber tape or paper tape with setting compound. NOTE: Tape has to be embedded and compounds allowed to set up before applying more plaster.
Veneer plaster on block or concrete.	Use bonding agent over concrete. Be sure surface is smooth (no projections). Fill or sand surface as needed. If block does not have good suction, score for good mechanical bond.	2-coat system is recommended. Application technique same as over gypsum.	Replace or repair broken blocks with veneer plaster. If using veneer for repair, set may be accelerated to help prevent cracking. If blocks need holes filled before veneering, use a veneer mix with sand added.

HOW TO MIX PLASTER MATERIALS

There are 4 things to think about when planning to mix materials:

1. Keeping everything clean.
2. The method of mixing.
3. What the material will be put on.
4. The kind of material that will be mixed.

Keeping Everything Clean

All tools must be kept clean. The water that will be added to the plaster material also has to be kept clean. So do not wash tools in the water that will be used to make the plaster mix.

After mixing a batch, clean paddle or spinner blades in a drum of water. Such a drum of water should be kept next to the mixing area. Mixer blades on a mixing machine should be turned off, or the clutch should be disengaged. Hose the sides and blades of the mixer machine clean. Dump out the water before starting a new batch. A mixer machine does not have to be cleaned until it is stopped.

Box Mixing

The oldest method is box mixing. Mix the cement material and the aggregate while both are dry. Mix until everything is all one color. When making gypsum plasters, a small amount of retarder is sometimes sprinkled over the sides and bottom of the box before adding the materials. This will help keep the box cleaner for more batches.

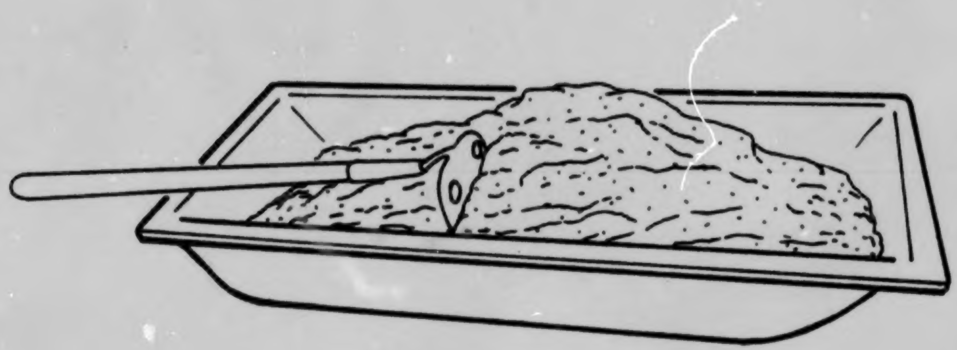
(See the illustration on the following page.)

"Charging" means to put the materials that will be mixed into the mixing container. To charge the mixing box:

1. Put half the aggregate needed into the box in an even layer.
2. Spread all the cementing material you will use evenly over the aggregate.
3. Put the rest of the aggregate evenly spread on top.
4. Add any admixtures that will be used.

Mix the dry materials.

1. Use a mortar hoe (a hoe with 2 holes in the blade).



2. Start at one end of the box and pull the hoe toward you using short choppy strokes.
3. Repeat until the material is mixed.

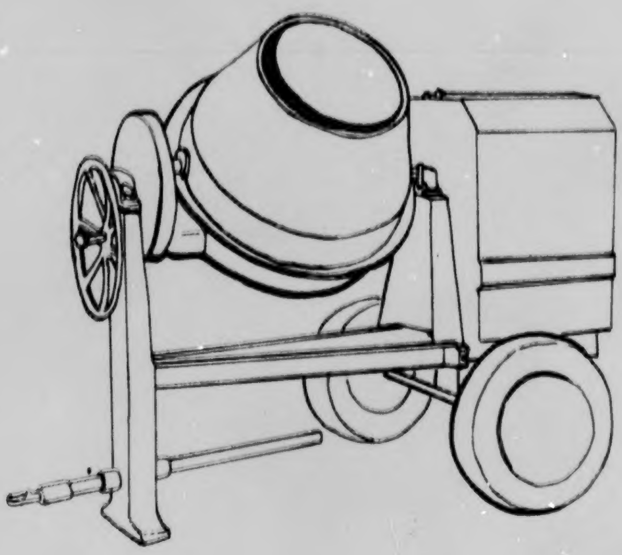
Add water.

1. Use the hoe to pull material toward you. Stack it carefully to make room to add water.
2. Add some water and pull the dry material into it. Use short choppy strokes. The hoe has to cut to the bottom of the box.
3. Continue adding water as needed.
4. As you go farther out into the box, make the hoe strokes longer. This will bring the hoe through more of the wet material.
5. Keep chopping until everything has been wetted and pulled to the end of the box.
6. Repeat, pulling the plaster to the opposite end of the box.

Do not add too much water. Add just enough to make a soft, plastic mass. Continue mixing until everything is one color. This usually means a good mix of materials. Overmixing makes the mortar set too soon, so be careful.

Machine Mixing Large Amounts

Materials that will be applied with a plaster gun have to be mixed by machine. The mixing machine is the best way to make sure that everything is very well mixed. A paddle mixer (an electric drill with special paddle or spinner attachment) can be used to mix smaller amounts.



Machine Mixer

To charge the mixer machine add materials in this order while the blades are turning:

1. Add all the water you will need.
2. Add half the aggregate.
3. Put in any additives.
4. Add the cement material.
5. Add the rest of the aggregate.

Let the mixer run about a miunte longer. Dump the mix into the work container: Box, wheelbarrow, plastering gun hopper, etc.

The best working load for a mixer machine is 2 inches or less above the blades. If it is charged higher, the materials will not mix well. The top part of the mix will end up dry and the bottom part soupy. More water or more dry materials may be added if necessary. But you should be careful.

NOTES

1. If the mixer is charged more than 2 inches over the blades, the plaster on top can look done--but the material on the bottom hasn't been mixed.
2. When using lightweight aggregates, the mortar can look dry even if enough water was used. Mixing longer will make the material wetter. The aggregate holds water to itself for a longer time than sand. Do not mix more than 3 minutes after machine is charged. Too much mixing of gypsum plasters make them set faster.
3. When using acoustical and exposed aggregate mixes, follow the manufacturer's recommendations on the amount of water, liquid binder, sand, etc., and the mix time, exactly.

Paddle mixing is recommended for smaller amounts of gypsum and stucco plasters, acrylic and epoxy emulsions, and drywall materials. The mixing containers are often rubber or plastic because they are easy to clean. Materials should be added in this order:

1. Add the amount of water or liquid you need.
2. Add a small amount of each dry ingredient. Each should be added in proportion to the full amount that will be needed.
3. Mix, then add more of each dry ingredient (always in proportionate amounts).
4. Stop adding dry materials when the mix reaches the right thickness for easy application.
5. Continue mixing material by moving the spinner or paddle blade up, down and around in the mixing container. This will make sure everything is mixed together.

NOTES

1. With factory-made emulsions, put material in the mixing container and add proper amount of catalyst.
2. If no additives are needed, just put the material in the mixing container and mix until it is workable.

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. When ______________ mixing, the ingredients are added a little bit at a time.

2. Gypsum/wood fiber mix is often used for ______________, ______________, and ______________.

3. When mixing, all tools must be kept ______________.

4. Gypsum/sand mix has a hardness rating of ______________.

5. Materials are added to the mixing machine while the blades are ___________.

6. In most cases, do not use more than ______________ cubic feet of perlite or vermiculite for each ______________ pounds of gypsum.

7. Gypsum ready mix is mixed at the ______________.

8. Gypsum with ______________ aggregate is the most common ______________ coat mix.

9. The oldest method of mixing plaster is ______________ mixing.

10. Paddle mixing is recommended for ______________ amounts.

11. Gypsum/perlite can have up to a ______________ hour fire rating.

12. The total thickness of the gypsum plaster put on many walls will be between _______________ inch and _______________ inch.

13. The weight of gypsum/vermiculite is _______________ to _______________ pounds per cubic foot.

14. A mixing machine is used for _______________ amounts.

15. Gypsum plasters made with perlite tend toward _______________ strengths.

16. A 1/2 inch thickness of gypsum plaster is about _______________ as strong in _______________ as a 3/8 inch thickness.

17. A vermiculite mix will weigh a bit _______________ than a perlite mix, but the perlite mix is _______________.

18. When box mixing, water is added _______________ the dry materials are _______________.

Self Assessment Answers

1. paddle
2. repairs, alterations, patching
3. clean
4. 2
5. turning
6. 2, 100
7. mill
8. sand, base
9. box
10. smaller
11. 4
12. 1/2, 7/8
13. 50, 55
14. large
15. lesser
16. twice, bending
17. less, harder
18. after, mixed

Job Sheet

COMPLETE THE FOLLOWING TASKS.

Materials and Tools

plaster materials
clean water
mixing box and hoe
mixing machine
paddle mixer
buckets or pails

1. Explain how and why you would mix gypsum materials for each of the surfaces listed below.

2. Mix materials for each of the surfaces listed below. Mix one batch in a mixing box, one in a mixing machine, and one by using a paddle mixer.

METAL LATH

GYPSUM LATH

MASONRY SURFACE

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ A gypsum/vermiculite mix will weigh a bit less than a gypsum/perlite mix but the perlite mix is harder.

2. ____ The total thickness of most gypsum plaster work is usually not more than 2 7/8 inches.

3. ____ Gypsum/perlite is harder than gypsum/vermiculite.

4. ____ When box mixing, add the water first and then the ingredients one at a time.

5. ____ Gypsum/perlite has a fire rating up to 4 hours.

6. ____ Gypsum/vermiculite mixes are not as strong as similar mixes using sand or perlite.

7. ____ For many mixes, the mixer machine should run about 1 minute after all the dry materials have been added.

8. ____ Sand is mixed with gypsum when perlite costs too much.

9. ____ Gypsum/wood fiber plaster is harder than gypsum/sand plaster.

10. ____ A mixer machine does not have to be cleaned until it is stopped.

11. ____ Do not use more than 100 cubic feet of perlite for each 2 pounds of gypsum.

12. ____ Retarder on the sides and bottom of the mixing box can help keep the box cleaner for more batches.

13. ____ Gypsum/sand plaster can have a 2 1/2 hour fire rating and weigh 100-115 pounds per cubic foot.

14. ____ One problem with gypsum ready mix is a lack of quality control because it is mixed at the factory.

15. ____ Gypsum/perlite does not provide good insulation against heat loss.

Instructor Post Assessment Answers

1. T
2. F
3. T
4. F
5. T
6. T
7. T
8. F
9. T
10. T
11. F
12. T
13. T
14. F
15. F

COMMON GYPSUM FINISH COATS

Goal:

The student will be able to identify and explain the characteristics of materials used in common gypsum finish coat plastering, including when used, how thick applied (to what tolerance) and will demonstrate (execute) knowledge by mixing materials to trade standard.

Performance Indicators:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Information section. This section will give you the information you need to understand the subject.

4. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

5. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

6. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

First you work very hard to get a base of one or more plaster layers applied and trued. Then you put on a finish coat. This is the coat that everyone will see. This is what people will look at. This is when they will say something about your skills as a plasterer.

This module will help you learn how to make a good finish coat, the kind that will make people say good things about your skills as a plasterer.

Supplementary References

1. *Plastering Skills and Practice*. F. Van Den Branden. 1971. pp. 285-295.
2. *Incentive Apprenticeship Training for Plasterers*. National Association of Home Builders. 1979. Unit 6, pp. 1-6.

Information

Finish coats are put on top of plaster base coats that have already been applied. The finish coats are used to make nice-looking surfaces. Since the walls and ceilings are about 3/4 of what a person sees in a room, the overall look of the room depends on how well the finish is done.

The base coats under the finish coat have to be true and straight. The finish coat is not used to "fix" anything. Finish coats are not put on a base unless a browning coat is first applied. (The only exception would be a one-coat veneer.)

The brown coat provides a straight, true surface. It provides the strength and bond that keep the finish coat intact and without cracks. The finish coat is sometimes applied in two operations:

1. A very thin layer of finishing material is forced into the brown coat.
2. When the first coat has bonded to the base coat, a second layer of finish coat material is applied, smoothed and troweled until it sets hard.

There are 3 common trowel (smooth) finishes:

* Gypsum-Lime Putty Trowel Finish
* Keenes Cement-Lime Putty Trowel Finish
* Prepared Gypsum Trowel Finish

There are 3 common textured finishes:

* Keenes Cement-Lime-Sand Float Finish
* Gypsum-Sand Float Finish
* Acoustical Plaster Finish

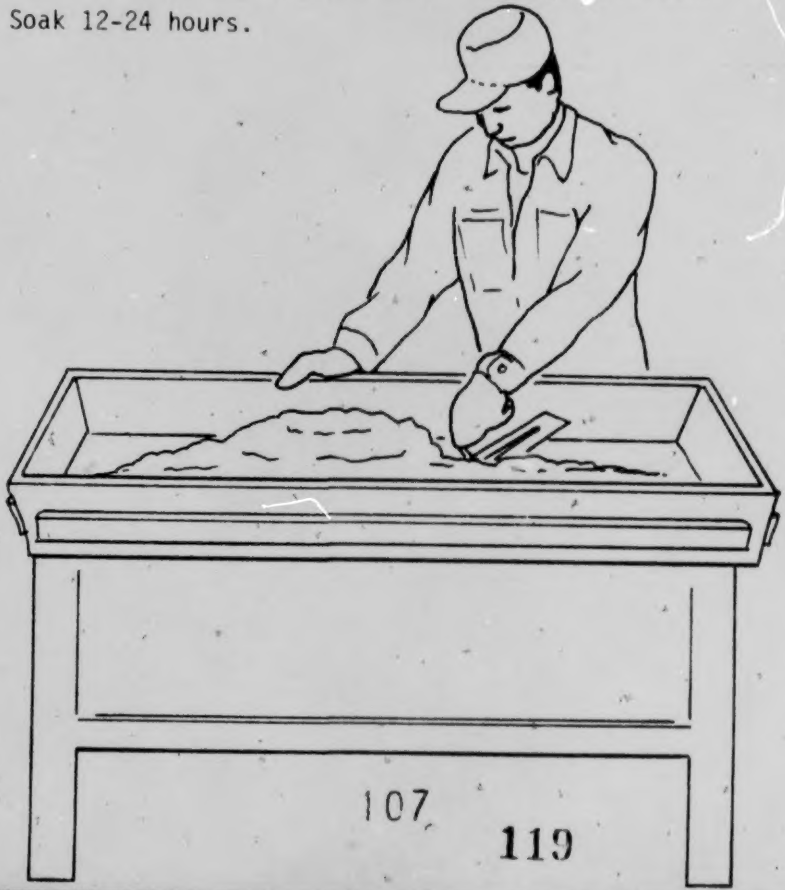
The thickness of a finish coat is usually at least 1/16" but not more than 1/8". Lime is used in 4 of the 6 common finishes. Lime is not part of the gypsum-sand float finish or the prepared gypsum trowel finish.

Lime can be used to make the mix easier to work. One problem with lime is that it will not set by itself. Also, it shrinks a lot when it is drying. Gypsum gauging plasters are used to overcome these problems. Lime comes in several different forms.

1. Special Hydrated Lime, which can be used right away (no soaking needed).
2. Autoclave Lime, which usually does not need soaking.
3. Hydrated Lime, which has to be soaked 12 to 24 hours before it can be used.
4. Lime Putty, which is what lime is called after it has been mixed with water.

Soaking Hydrated Lime

1. Fill a clean mortar box or putty tank with clean water. Use two 14-quart pails of water for each 50 pound bag of lime.
2. Slowly sift lime into the water through a screen.
3. Soak 12-24 hours.



4. The lime putty may also be hoed shortly after it is soaked to break up lumps and make a smooth paste.
5. The soaked putty usually has to be screened through a 1/4" mesh screen or metal lath. This also helps to break up lumps. If the lime putty is mechanically mixed in a machine or with a paddle mixer, this screening usually is not needed.

NOTE: If you do not use enough water, there will be small lumps of unsoaked lime. This is called "burned" lime.

GAUGING PLASTERS

Regular "neat" gypsums are not the same as gauging plasters. The gauging plasters are specially ground. The name "gauging plaster" tells what it does.

A gauging plaster controls (or gauges) the speed of the finish coat set. Gauging plaster can be a quick, medium or slow set. Instead of using accelerator or retarder admixtures, always try to use the correct set gauging plaster.

The Common Gauging Plasters Are:

- Regular gauging plaster (available in quick or medium set).
- Molding plaster (for fine work fast setting).
- Keenes cement (a special plaster, not really a cement, sets slower).

Since these are gypsum materials, they are almost always used for interior work rather than exterior work.

GYPSUM-LIME PUTTY TROWEL FINISH

This material is often called white coat finish. It is used as a finish coat when a white surface without texture is needed. Be sure to follow the mixing proportions you are given in the specifications. Check cracking, crazing, bond failure or softness can happen if you don't.

Mixing

Can be ring mixed as described later in this module.

Example: 10 lbs. of dry gypsum gauging plaster.
30 lbs. of hydrated lime.

When used as a finish coat over a lightweight base coat, adding 1/2 cubic foot of fine silica sand or perlite fines for each 100 lbs. of gauging plaster is recommended. For a harder surface, add more plaster. More than a 2:3 mix will be hard to spread.

Gypsum-Lime Putty is a low cost material that spreads easily. It works well on a medium suction base.

KEENES CEMENT-LIME PUTTY TROWEL FINISH

Makes a hard surface. Since there are also hard veneer plasters and hard regular gypsum plasters available, Keenes cement may not be used as much. The mix should be used only with very strong base coats. After applying, watch the surface and occasionally trowel until completely set.

Mixing

Can be machine mixed or ring mixed.

Keenes cement is used as the "gauging plaster."

Example: Medium Hard Finish, 100 lbs. Keenes cement to 50 lbs. dry hydrated lime.

Example: Extra Hard Finish, 100 lbs. Keenes cement to 25 lbs. dry hydrated lime.

When used with lightweight aggregate base coats, add at least 1/2 cubic foot of silica sand or perlite fines for each 100 lbs. Keenes cement.

The hardness of the finished surface depends on the amount of lime used. More lime means a less hard surface. Keenes cement can also be used without lime. As long as the plaster is on the mortarboard and unset, it can be wetted and remixed. Keenes cement is a slow setting material (2, 4, 6 hours).

PREPARED GYPSUM TROWEL FINISH

This material is mill mixed, so there is good quality control among batches.

It is easy to work and sets to a very hard surface. It develops a good bond over a gypsum base.

Mixing

Can be mixed in a box or by machine.

Needs only to have water added. Mix does not have lime in it.

To get the best results, a very thin first coat can be applied. It should be finish troweled early, before it sets.

KEENES CEMENT-LIME-SAND FLOAT FINISH

This is a common float finish that resists cracking. It is often used over lightweight aggregate base coats. Color can be mixed with the dry plaster to make a colored plaster.

Mixing

Can be box or machine mixed.

The kind of texture you will get is controlled by the type and amount of sand that is used. A mix that is good for texturing is:

100 lbs. Keenes cement
100 lbs. hydrated lime
300 lbs. silica sand

This is a low-cost finish. The sand float finish is less likely to crack than a smooth trowel finish. If a gauging plaster is added to change the set time, it should be added just before the material is applied. Gauging plaster should not be added at any other time.

GYPSUM-SAND FLOAT FINISH

A common finish coat. As with the Keenes-Lime-Sand Float Finish, the texture is controlled by the amount and type of sand used. It sets fast.

Mixing

Can be mixed by box or by machine.

A common mix is 1 part gypsum to 2 parts of very fine white sand that has been size-screened.

Usually it is floated with a rubber sponge or a sponge float. May also be floated by clipping carpet onto a drywall sander. If the sand is too fine, it can make tiny cracks and a weak surface. It should not be put on too thick. It should not be used to fill hollows or cavities because it can crack. It is often applied the day after the brown coat was applied.

ACOUSTICAL PLASTERS

An acoustical plaster is specially made to have holes inside it after it sets. These holes "trap" sounds and noises to help soundproof a space. It is used on ceilings and on the upper parts of walls where abrasion is not likely to happen.

Mixing

Usually ready-mixed at the mill.

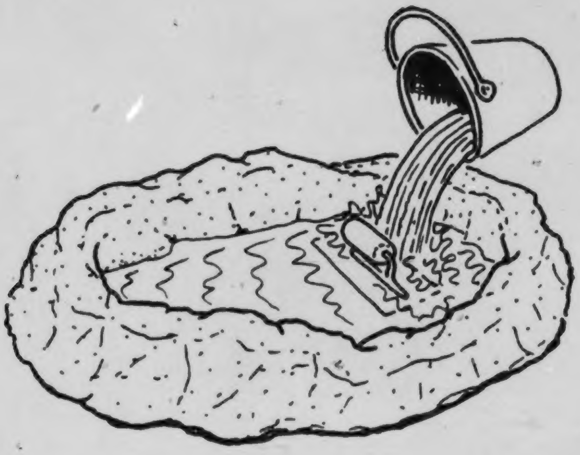
Acoustical plaster is not as hard as other plasters. It does not have great suction. It is applied in 2 or more coats, by hand or by machine. If applied in 2 coats, each should be 1/4" thick. The best total thickness is 1/2". Less thick means it won't work well as a soundproofing. More than 1/2" of material adds to the cost, but does not add much to the sound proofing. It resists cracking and can be shaped to fit fancy shapes or contours.

RING MIXING

Used to mix the Gypsum-Lime Putty Trowel Finish. Sometimes used to mix Keenes Cement-Lime Trowel Finish.

1. Form the lime putty into a large ring. Place some putty in the center of the ring and spread some over the bottom.
2. Place a trowel on the lime. You will pour the water over the trowel. It helps keep from washing away the lime.
3. Pour clean water over the trowel.

(See the illustration on the following page.)



4. Sift gauging plaster in slowly. Let it sink into the water. Keep it from making lumps. The mixture should stand until there is no gauging plaster left on the water.

WARNING: The lime in this mix can hurt you. Do not let it splash. If some should splash in your eyes, flush it out with clean water immediately.

5. Right away, start mixing the plaster and the putty. Use the hawk and the trowel. (The plaster starts to set as soon as it gets wet.)
6. Start in the center by breaking up the stiff, soaked plaster and mixing in the putty.
7. Cut in the inner part of the putty ring and mix it.
8. Push in the outer edge of the putty ring and mix it.
9. Use right away.

NOTES:

1. The batch should be handled as little as possible. Any mixing or moving will make it set faster.
2. A special mechanical mixer can also be used. It is especially good with limes that don't have to be soaked.

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. When ring mixing, a ____________ is used to keep the ____________ putty from ____________ away.

2. When lime is going to be soaked, it has to be ____________ into the water to keep ____________ from forming.

3. The Keenes Cement-Lime-Sand ____________ Finish is ____________ likely to crack than a trowel finish.

4. The thickness of a finish coat is usually at least ____________ inch, but not more than ____________ inch.

5. When mixing lime, remember that it can ____________ you.

6. A gauging plaster ____________ the ____________ of the finish coat set.

7. Gypsum-Sand Float Finish can be floated with a ____________ ____________ or a ____________ ____________.

8. When ring mixing, the ____________ plaster is ____________ into the water slowly.

9. The walls and ceilings are about ____________ of what a person sees in a room.

10. There are ______________ common gypsum finish coats.

11. Hydrated lime has to be soaked ______________ to ______________ hours before using it.

12. The total thickness of acoustical plaster should not be more than _________ inch.

13. The more lime you add to a mix, the ______________ it will get.

14. Lime makes a mix ______________ to work.

15. An acoustical plaster has ______________ inside after it sets.

Self Assessment Answers

1. trowel, lime, washing
2. sifted, lumps
3. float, less
4. 1/16, 1/8
5. hurt
6. controls, speed
7. rubber sponge, sponge float
8. gauging, sifted
9. 3/4
10. 6
11. 12, 24
12. 1/2
13. softer
14. easier
15. holes

Job Sheet

COMPLETE THE FOLLOWING TASKS.

Materials: Hydrated lime, gauging plaster, Keenes cement, sand, mixing tools and equipment.

1. Soak hydrated lime as described in this module.
2. Mix gypsum-lime putty plaster using the ring mixing method described in this chapter.
3. Use a mechanical method to mix at least one other finish plaster described in the module.

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ If sand that is too fine is used to make Gypsum-Sand Float Finish plaster, then the sand can make tiny cracks in the plaster.

2. ____ Lime is used to make gauging plaster set faster.

3. ____ Gypsum-Lime Putty plaster can be troweled to make a white surface without texture.

4. ____ The finish coat gives a wall a straight, true surface.

5. ____ When ring mixing, make a ring of gypsum plaster and sift the lime in the center.

6. ____ One important part of soaking lime is to make sure there is a smooth paste without any lumps.

7. ____ Prepared gypsum plaster develops a good bond over a gypsum base.

8. ____ A finish coat is sometimes put on in 2 layers.

9. ____ When ring mixing, the hawk and trowel are used to mix the materials.

10. ____ With Keenes Cement-Lime Putty plaster, add more lime to make a harder surface.

11. ____ The total thickness of acoustical plaster should not be more than 1/8 inch.

12. ____ Acoustical plaster is harder than other plasters.

13. ____ Hydrated lime is a type of lime that has to be soaked for at least 12 hours.

14. ____ Keenes Cement-Lime-Sand plaster tends to get a lot of cracks when it is floated.

15. ____ Trowel finishes have a grainy texture.

Instructor Post Assessment Answers

1. T
2. F
3. T
4. F
5. F
6. T
7. T
8. T
9. T
10. F
11. F
12. F
13. T
14. F
15. F

COMMON VENEER PLASTERS

Goal:

The student will be able to identify and explain the characteristics of materials used in common veneer plastering, including when the materials are used, how thick they are applied (to what tolerance) and will demonstrate (execute) knowledge by mixing materials to trade standard.

Performance Indicators:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Information section. This section will give you the information you need to understand the subject.

4. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

5. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

6. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

Veneer plastering gets its name because the veneer systems use a very thin layer of plaster. The fact that veneer systems are easy and quick has made them very popular. They can save the boss time on the job. And that saves money. Much of the work done today uses veneer techniques and materials. This module will help you learn about mixing and using veneer plasters.

Supplementary References

1. Gypsum Construction Handbook. United States Gypsum Company. 1978. pp. 72-74, 148-157.

2. Incentive Apprenticeship Training for Plasterers. "Unit 5: Applying the Base Coat." National Association of Home Builders. 1979. pp. 8-11.

Information

Veneer plastering can save a lot of time. Many jobs can be started and finished the same day. The surface can be painted 24 hours after it is finished. Veneer plasters are mill mixed, so only clean water is needed. Veneer mixes easily and can be troweled to a smooth finish or can be lightly textured. As with regular gypsum plasters, it is used mainly to cover interior surfaces. Some special thin-coat veneers are available for exterior work.

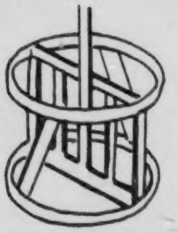
Veneer plaster is usually applied only to specially made gypsum board lath. If this board lath shows any damage, it must be fixed before the veneer is applied. Follow the manufacturer's directions for faded areas as well as paper rips, etc. There are also materials that can be sprayed on regular gypsum board so that veneer can be used.

The joints between pieces of board lath are covered with fiber glass tape set in veneer, or can be covered with paper tape that is put in a special joint compound. Care must be taken to make sure taped joints don't show through the thin veneer, and the compound in the taped areas has to set up before the veneer is applied.

Veneer can be put on masonry or painted surfaces if a bonding agent is used. Masonry surfaces must be level. Veneers are also available for use over radiant heating systems.

There are two veneer systems, a one-coat system and a two-coat system. The total thickness of either system is not more than 1/16" to 3/32".

The veneer plasters can be applied by hand using regular tools and techniques. If applied with a spraying machine, the fast set of veneer can make problems. Veneer sets faster when it is sprayed than when it is applied by hand. Special veneers are available for use with spraying equipment.



Cage-type Blade

A special cage-type mixer blade is used to mix the plaster. The blade is powered by a high speed drill (900-1000 rpm).

When mixing, use a 12 to 15 gallon container with smooth sides. The container should be strong enough to hold up to the blows of the blades hitting it. If the mixing is done too long, this will make it set faster. Since it sets quickly anyway, you don't have any time to waste by mixing it too long. You can save mess on your mortarboard by covering it with kraft paper. Put the plaster on the paper and then throw the paper away when you are done.

The set time is about 40 to 60 minutes. That means you have to have it all applied by then. It is very important to follow the manufacturer's directions about the amount of water used (as well as all other directions). Also remember to spread each coat well. Veneer plaster does not cover up mistakes. Anything will show through.

GENERAL RULES FOR VENEER WORK

Winds, breezes and drafts should be kept away when you are working with veneer. Any kind of wind will make it set faster. A temperature of 55° to 60° F. is good.

Joint Taping

The fiber glass tape can be stapled in place. Some fiber glass tape has adhesive on one side. This type can be pressed onto the veneer gypsum board. With all kinds of tape, be sure that the pieces are not overlapped. Overlapped tape will show through the veneer plaster. The adhesive type of tape should be pressed along its whole length to make sure it sticks good. This will also get rid of any wrinkles.

The stapled tape is put on with 3/8" staples. Wall and partition angles are stapled on only one side. Work from top to bottom, and the tape has to bridge joints at interior corners.

Glass fiber tape is preset by embedding it in veneer plaster. This plaster has to set before plastering is started. Presetting makes the mesh of the glass fiber tape expand. Beads and trims also must be filled.

Veneer base coat is the fill if you are using a 2-coat system. Use the veneer finish if you are working with a 1-coat system. Apply the full coat when the material has set, but before it dries.

When using paper tape, first fill the joints with a special joint compound. The tape is embedded in this. Center the tape over the joint. Press it into the joint compound with a trowel held at a 45° angle. Use the trowel to get rid of extra compound when you press it along the tape. Right after the tape is embedded, apply a skim coat of compound. This will mean there is less chance for edges to wrinkle, curl or crack.

Let this set, then put on a fill coat of compound. Feather this coat out about 3 or 4 inches on each side of the tape. Let this set. It should also be at least partly dry before plastering. (Totally dry is better.) Embedding the tape and covering it with a fill coat should be done as two separate steps.

APPLYING THE ONE-COAT SYSTEM

One coat veneer is applied by using the scratch and double-back method. Most of the plaster is put on in the first coat. Make the whole surface as even as possible, about 1/16" thick. When this is firm, double back with a skim coat. Smooth the surface to at least 3/32" thick. Just before the surface sets, trowel to a smooth finish. Use as little water as possible. Use light pressure on the trowel to keep the veneer from blistering.

APPLYING THE TWO-COAT SYSTEM

The tape-and-compound must be set up before starting. Apply a thin scratch coat over the whole area. Use plaster from the same batch and double back. The first coat should be 1/16" to 3/32" thick. This coat should make a level surface. Brush or cross-rake with a fine wire rake before the coat sets.

When troweling the finish coat, hold the trowel flat. Use as little water as you can. This troweling is done after the surface is firm but before the final set.

NOTES ON APPLYING ONE- AND TWO-COAT SYSTEMS

1. Plan so that all of one area can be covered at one time. Work to a ceiling angle or wall corner.
2. Do the ceiling first.
3. Veneer set can usually be seen when the plaster starts to get darker.
4. Don't overtrowel through the set.
5. If less than 1/16" thick, dryout, cracking, surface softness or dusting may happen.
6. If scratch and double-back is not done, blistering is very likely to happen.

Mixing

1. Don't add anything unless the manufacturer recommends it.
2. Add the plaster slowly while the mixer is turning.
3. After all the plaster has been added, mix at least 2 minutes longer. Do not mix more than 5 minutes.
4. Extra mixing just takes away from your working time.
5. Mixing at too slow a speed can make lumps. It will also take away from your working time.
6. Hot or cold weather and hot or cold mixing water can change the set time.
7. Tools that have not been cleaned properly can also speed up the set time.

RADIANT HEAT SYSTEM

Apply and trowel parallel to the direction of the heat system's cables. Be sure to cover all the cable used to conduct heat.

Level and lightly scratch the base coat. The base coat should be about 3/16" thick. Apply finish coat 1/16" to 3/32" thick. It can usually be applied the day after the base coat. Use the scratch and double-back technique. the first coat should be thin.

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. One coat veneer is applied by using the ____________ and ____________ method.

2. Set time for most veneer is ____________ to ____________ minutes.

3. The total thickness of most veneer systems is not more than ____________ inch to ____________ inch.

4. Presetting makes the ____________ of the glass fiber tape ____________.

5. Masonry surfaces must be ____________ if a veneer will be used.

6. When applying veneer, do the ____________ first.

7. It is very important to follow the manufacturer's directions about the amount of ____________ to be used.

8. Veneer plastering can save a lot of ____________ and ____________.

9. The first coat in the 2-coat system is ____________ or ____________.

10. You can save mess on your mortarboard by covering it with ____________ ____________.

11. Tape that is ____________ will show through the veneer.

12. Veneer is used mainly to cover _______________ surfaces.

13. If applied by machine, veneer will set _______________.

14. Veneer plaster does not cover up _______________.

15. Some veneers are made to be used over radiant _______________ systems.

Self Assessment Answers

1. scratch, double-back
2. 40, 60
3. 1/16, 3/32
4. mesh, expand
5. level
6. ceiling
7. water
8. time, money
9. brushed, cross-raked
10. kraft paper
11. overlapped
12. interior
13. faster
14. mistakes
15. heating

Job Sheet

COMPLETE THE FOLLOWING TASKS.

Materials: Tools and equipment for mixing veneer plaster, veneer plaster mixes (both 1-coat and 2-coat), admixtures/aggregates recommended for use with the veneers, admixtures/aggregates not recommended for use with the veneers, veneer board lath pieces.

1. Mix several batches of veneer plaster. Add recommended materials to some of the batches. Add materials which are not recommended to some of the batches. Keep track of what was put in each batch. Mix at least one batch to which nothing extra is added.
2. Repair any damaged areas on the board lath.
3. Apply some of each batch to a piece of veneer board lath.
4. Let the plaster materials cure and watch what happens.
5. Use the space below to describe what happens.

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ When applying veneer to a radiant heat system, never trowel parallel to the heating cables.
2. ____ Veneer plastering saves a lot of work but takes more time.
3. ____ Use heavy pressure when troweling a veneer surface to keep it from blistering.
4. ____ The total thickness of most veneer systems is about 3/4 inch.
5. ____ Board lath joints are covered with masking tape before applying the veneer.
6. ____ Veneer plaster should never be less than 1/16 inch thick.
7. ____ Any type of board lath can be used as a base for veneer without special preparations.
8. ____ Veneer should never be used on painted surfaces.
9. ____ Veneer plasters have to be mixed with a high speed drill.
10. ____ When the plaster starts getting darker, you know it has begun to set.
11. ____ Veneer plasters are hard to mix.

12. ____ When using paper joint tape, embedding the tape and covering it with a fill coat should be done as one step.

13. ____ When spraying, special veneer plasters are often used.

14. ____ Board lath joints have to be covered very carefully.

15. ____ You should plan your work so that all of one area can be covered at one time.

16. ____ A veneer should be mixed at least 2 minutes after everything is added, but never more than 5 minutes.

Instructor Post Assessment Answers

1. F
2. F
3. F
4. F
5. F
6. T
7. F
8. F
9. T
10. T
11. F
12. F
13. T
14. T
15. T
16. T

COMMON STUCCO PLASTERS

Goal:

The student will be able to identify and explain the characteristics of materials used in common stucco plastering, including when used, how thick applied (to what tolerance) and will demonstrate (execute) knowledge by mixing materials to trade standard.

Performance Indicators:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Information section. This section will give you the information you need to understand the subject.

4. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

5. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

6. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

This module will help you learn about plaster materials that can be used outside. They make a waterproof surface over lath or other bases. The plaster material is called portland cement plaster or stucco. This module will help you learn about mixing the different coats of common stucco mixes.

Supplementary References

1. Plastering Skill and Practice. F. Van Den Branden. 1971. pp. 142-147.
2. Incentive Apprenticeship Training for Plasterers. "Unit 4: Materials II and Bases." National Association of Home Builders. 1979. pp. 15-22.

Information

Stucco is mainly used outside, but can also be used on interior walls, such as where moisture may be a problem or the walls will get hard wear. Stucco is called portland cement plaster when used for interiors. Stucco is fire resistant and durable. The strength and density of it gets better as it gets older.

It can be applied by hand or by machine. Stucco can be applied to metal lath, masonry, concrete, old stucco. Metal lath should be galvanized if the wall will be exposed to moisture. Use a bonding agent where needed.

Limitations

1. Do not apply stucco over gypsum lath or gypsum plaster.
2. The curing of stucco takes longer and needs special care.
3. It cannot be applied in freezing weather without taking special steps.
4. It may react to aluminum.

Notes

1. Keep stucco damp as long as possible. It must be kept damp until it has set and is hard.
2. Care must be taken to keep water from getting behind the stucco.
3. Stucco base coats are also covered in the module on base coats. (See the chart "Base Coats for Gypsum and Stucco" in that module.)

OVERVIEW OF STUCCO

The basic mix for stucco is 1 part cement to 3 parts sand. Base coats are made with sand that is more coarse and finish coats are made with sand that is more fine. It is usually a good idea to make the mix as poor (less cement) as possible, to help stop cracking.

For high suction bases, you should set the base instead of changing the mix. The only time to change the base mix would be in very hot weather or with a very high suction base. Then, add a bit more sand and water. But always try to get by with as little added as possible. Adding water affects stucco more than it does a gypsum plaster.

When being put over framing, the total thickness has to be at least 3/4" to 1". Anything less will crack. If stucco is being applied to masonry, 1/2" to 5/8" might be enough. Generally, stucco should not be put on any base that is not as strong as the stucco. There are two ways to apply stucco:

1. Conventional Method, apply similar to gypsum materials, with 2 or 3 coats. Let each coat set before applying the next.
2. Monolithic Method, the different coats are applied very soon after each other. The whole thickness ends up more like one unit, more like concrete.

Curing Stucco

The temperature should be at least 50° F. If the temperature is lower, the stucco will cure slower. It must be sprayed with fine water mist while it is curing. This is to keep it from drying out before it sets. Windbreaks and shades can be used to slow down the drying out.

For colored stucco, be sure to follow any special manufacturer's directions. Chemical spray-on cures can also be used to speed up the cure time. If a chemical cure is used on a base coat, make sure it can be plastered over. The brown coat has to be uniformly damp to make sure the color of the finish coat will be uniform. Admixtures can also be used that will affect the curing time.

CURING SCHEDULE

Coat	Moist Cure	Setting Time Between Coats
Scratch	12-24 hours	24-48 hours
Brown	48 hours minimum	7 days minimum
Finish	12-24 hours	48 hours minimum

SCRATCH COAT

Try not to disturb this coat with extra troweling or movement when it is being applied. Doing so can make it break off, or weaken the bond.

Mixing

One part cement to 3 parts sand for most work.
1:3 1/2 for high suction bases.

Applying

The scratch coat has to be at least 3/8" thick. Usual is 3/8" to 1/2". Score the coat before it hardens, 2 directions on ceiling, horizontally on walls. Keep damp until brown coat is applied.

BROWN COAT

Sometimes a little waterproofing is added to the mix for the brown coat. Water loss is less this way. The working surface is low suction (or "cool") when the waterproofing is used.

Mixing

The 1:3 mix is common.

Applying

The brown coat has to be at least 3/8" thick. Some feel 1/2" is better. Some plasterers like to lightly cross-scratch the brown coat of exterior work.

Water should not be applied when rodding or floating the brown coat. It can be applied 24 hours after the scratch coat. The scratch coat must be evenly damp. The surface is trued and evened by rodding, then floated to compact and flatten. Do not leave slick or smooth spots on this coat. A bit of roughness is needed to make a good bond for the finish coat.

FINISH COAT

It may take more time to work a stucco finish coat to the texture you want. The finish coat should be moisture-cured at least 24 hours after it is applied.

Mixing

A float finish may need a 1:2 mix to be worked easily. Other finish mixing proportions are also possible. Some are listed later in this module.

Applying

Thickness should not be less than 1/8". If a larger aggregate is used, thickness may vary up to 1/4".

If the brown coat has been kept damp, a finish coat can be applied after 24 hours. Wait at least 7 days if the brown coat has dried. Most common float tools can be used to get a desired surface.

MONOLITHIC METHOD

The coats are applied soon after each other. The effect becomes more of a single coat, something like concrete. Machine spraying is often used with this method. A solid backing is needed.

Mixing

The 1:3 mix can be used.

Applying

In applying 2 coats, each should be about 3/8". The first can be a bit more, the second a bit less. Apply the first coat. Let it set until firm. Then apply the finish coat. The finish coat can often be put on 3 or 4 hours after the first coat.

Sometimes 3-coat work is done over a flexible lath. Let the scratch coat set up hard before browning. This will give you the firm surface needed.

OTHER MIXES

(See the charts on the following page.)

MIXES FOR STUCCO WITH LIGHTWEIGHT AGGREGATE

Portland Cement	Perlite	Vermiculite	Autoclave Lime	Mason Cement	Water
1 bag	3/4 bag		1/2 bag		10 gal.
1 bag	3/4 bag			1/2 bag	10 gal.
1 bag		3/4 bag	1/2 bag		11 gal.
1 bag		3/4 bag		1/2 bag	11 gal.

OTHER STUCCO MIXES (By Volume)

Portland Cement	Lime	Sand
1	1/4 to 2	5 to 10
1	1/2 to 1 1/4	4 1/2 to 9
1	1 1/4 to 2	5 to 10

Stucco can be remixed before the second set begins. But don't add more water. Portland cement is available in white or gray color. Too rich a mix makes cracks. Too poor a mix makes less strength (and also cracks). If colors or other admixtures are used, make sure the use is recommended by the manufacturer.

EXPOSED AGGREGATE MIXES SUCH AS MARBLECRETE

Marblecrete can be made by combining marble dust with stucco plaster. Many different aggregates could be used: Marble chips, pebbles, glass, quartz, etc. Also the stucco can be colored to match or contrast with the aggregate material. The combinations are as many as you can imagine.

The final surface is easy to take care of, durable and waterproof. It is a bit like a "texture," like forming stucco to look like rocks or bricks.

One mix is:

Portland cement	100 pounds
Sand	1 bag

Autoclaved lime	50 pounds
Water	20 gallons
#16 marble dust	100 pounds
#20 marble dust	100 pounds

When using a mechanical mixer, add the materials in this order:

1. Water.
2. One half of the coarse silica sand.
3. Autoclaved lime.
4. Portland cement.
5. #16 marble dust.
6. #20 marble dust (add slowly)
7. Remaining silica sand.

Continue to mix the materials for about 5 minutes after all materials have been added. More water may be needed. Apply about 1/2" thick.

Other exposed aggregate finish coats can be made by mixing portland cement with latex, liquid acrylic, polymer or lastric type binders and recommended aggregates. A paddle mixer is often used to blend the materials. There are also epoxy-type binders which only become "active" when two special materials are mixed together. With all mixes, be sure to follow the manufacturer's mixing and application directions very carefully. The thickness of a finish coat using these materials may be 1/8" or less.

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. Stucco can be remixed before the _______________ set begins.

2. Stucco must be kept damp until it has _______________ and is _______________.

3. For curing, the temperature should be at least _______________.

4. The thickness of the finish coat can be from _______________ inch to _______________ inch, depending on the _______________ of the aggregate.

5. Stucco is called portland cement _______________ when used for interior work.

6. The basic mix for stucco is _______________ part cement to _______________ parts sand.

7. Portland cement is available in _______________ and _______________ colors.

8. Over framing, the total thickness has to be at least _______________ inch.

9. Stucco may react to _______________.

10. With the monolithic method, the effect becomes more of a _______________ coat, something like _______________.

11. If possible, you should ______________ the base instead of ______________ the mix.

12. The strength and density of stucco gets ______________ as it gets older.

13. Marblecrete is an ________________ aggregate mix made with marble ________________.

14. In 3-coat work, the scratch and brown coats have to be at least ____________ inch thick.

15. The curing of stucco takes _________________ than gypsum plasters.

Self Assessment Answers

1. second
2. set, hard
3. 50° F.
4. 1/8, 1/4, size
5. plaster
6. 1, 3
7. white, gray
8. 3/4
9. aluminum
10. single, concrete
11. wet, change
12. better
13. exposed, dust
14. 3/8
15. longer

Job Sheet

COMPLETE THE FOLLOWING TASKS.

Materials: Tools, equipment and materials needed to prepare at least 3 small batches of a 1:3 stucco mix, 3 sheets of plywood.

1. Mix a small batch of 1:3 stucco mix. Add extra sand and see what happens. Spread the mix on a sheet of plywood.
2. Mix a small batch of 1:3 stucco mix. Add extra portland cement and see what happens. Spread it on a sheet of plywood.
3. Mix a small batch of 1:3 stucco mix. Spread it on a sheet of plywood.
4. Cure all 3 sheets covered with stucco mix.
5. Use the space below to describe what happens with each of the sheets.

INDIVIDUALIZED LEARNING SYSTEMS

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ With the 3-coat method, the scratch coat has to be at least 3/4 inch thick.
2. ____ For high suction bases, you should wet the base instead of changing the mix.
3. ____ Stucco can be used on interior walls where they might get hard wear.
4. ____ Exposed aggregate mixes are sand blasted to bring the aggregate to the surface.
5. ____ The finish coat should not be less than 1/8 inch thick.
6. ____ Chemicals can be used to speed up a cure.
7. ____ The basic stucco mix is 1 part sand to 3 parts cement.
8. ____ With the monolithic method, the finish coat can often be applied 3 or 4 hours after the first coat.
9. ____ The brown coat should be troweled as smooth as possible.
10. ____ Stucco cannot be applied in freezing weather without special care.
11. ____ If the temperature is below 50° F., stucco will cure faster.

12. ____ When using the monolithic method, each coat should be about 1 inch thick.

13. ____ Stucco can be applied by the monolithic or the concrete methods.

14. ____ The finish coat should be moisture-cured at least 7 days after it is applied.

15. ____ Stucco is a good material to put over aluminum.

Instructor Post Assessment Answers

1. F
2. T
3. T
4. F
5. T
6. T
7. F
8. T
9. F
10. T
11. F
12. F
13. F
14. F
15. F

NEW SYSTEMS

Goal:

The student will be able to identify and explain the characteristics of materials used in new systems (such as Dryvit, Compo-Settef or Cota) of plastering, including when the materials are used, how thick they are applied (to what tolerance) and will demonstrate knowledge by installing and finishing a surface to trade standard.

Performance Indicators:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Information section. This section will give you the information you need to understand the subject.

4. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

5. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

6. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

New systems use new materials. The materials are made so they can be worked with regular plaster tools and techniques. But there are special things about the new systems and their materials that you will need to know. New systems are a growing part of the plastering trade. This module will help you learn about them.

Supplementary References

1. Thermal Wall Insulation and Finish Systems. Compo Industries, Inc. 1980. Entire booklet.

2. Exterior Insulation - Solid State Systems. Cota Industries. n.d. pp. 1-11.

3. Outsulation, Exterior Wall Insulation and Finish Systems. Dryvit System, Inc. 1981. pp. 9-11, 20-23.

Information

The new systems use materials that can be worked like plaster. These materials can be fiberglass, plastic, acrylic, etc. They may be used with something like portland cement, or they may be used by themselves.

Many new systems involve installing insulation at the same time a plasterer is applying a surface. The materials may be new, but for the most part, the same tools and techniques are used.

The insulation is usually a foam plastic panel. The panels can be prefinished with an exterior coating. All these panels need is to be installed to the framework of the building. Or the panels can be finished on the job. There are ways to install these materials on older buildings as well as new construction. When the materials are installed on older buildings, the process is called "retrofitting."

The insulation panels are often put on the outside of the building, whether it is a new building or an old one. The insulation board can be precut to fit openings, projections, etc. Then the pieces are fitted at one time. One difference from gypsum board lath is that these insulation panels have to be fitted very tightly together. Putting the insulation on the exterior can save interior space.

As with regular plaster materials, steps have to be taken to protect new systems' materials from water getting behind the protective surface coats. So, places where the insulation board joins other materials or the insulation board ends (roof lines, window jambs, flashings, etc.) must be protected to keep water from getting behind the insulation board. Insulation board corner shapes and other special shapes are also available.

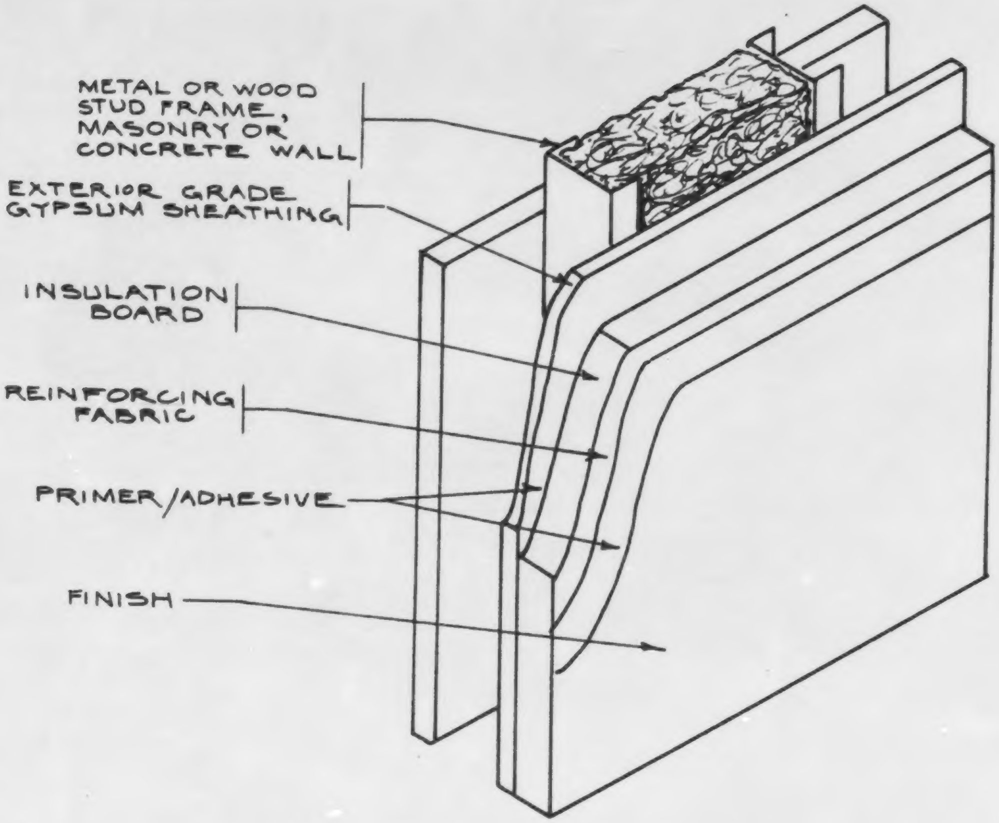
Panels are available for many different uses. Some of these uses are: Load-bearing panels, infill panels, fascia and soffit panels, spandrel, parapet and curtain wall panels, 2-dimensional and 3-dimensional panels.

WHAT THE MANUFACTURERS SAY ABOUT THEIR PRODUCTS

1. An insulation and finish system that can be used as exterior insulation on all new construction.
2. Can also be applied to interior walls.
3. Can be retro-fitted to many older buildings.
4. Will make an older building look modern and also provide insulation at less cost than the conventional methods.
5. As an exterior insulation, this will save space on the inside of a building.
6. Retro-fitting can be done without major disruption to the building's occupants.
7. Can be installed as premade panels. This means the panels can be made inside during bad weather and installed during good weather. Provides year-around employment instead of seasonal.
8. Allows more building design for lightweight wall construction.
9. Cost saving and energy conserving.
10. Means lower capacity heat and cooling equipment can be used. This is less expensive for new construction.
11. Makes it easier to maintain a stable building temperature.
12. Resists cracking.
13. Very little maintenance needed.
14. Many finish coat textures and colors are possible using regular plastering techniques with the manufacturer's special plastering materials.

USING THE NEW SYSTEMS
(See the illustration on the following page.)

1. The base. May be metal or wood stud frame, masonry, concrete, etc. See the list of materials that can be used as a base later in this module.
2. Exterior grade gypsum board lath.


METAL OR WOOD STUD FRAME, MASONRY OR CONCRETE WALL
EXTERIOR GRADE GYPSUM SHEATHING
INSULATION BOARD
REINFORCING FABRIC
PRIMER/ADHESIVE
FINISH

3. Insulation board. In some cases, the insulation board may be installed directly on the base material. Insulation board is available in different sizes, thicknesses and shapes.
4. Fiberglass mesh fabric. It is embedded in the special primer-adhesive. Provides reinforcement for the whole system.

   NOTE: To improve the shock or stress rating, 2 or more layers of primer-adhesive and fiberglass mesh can be installed. Each layer must be allowed to cure before the next one is applied. This will help a wall hold up better to things like vandalism.
5. The combination primer and adhesive material. It is applied with standard plastering techniques and tools.
6. Plaster material, often portland cement with one or more synthetic admixtures. Applied with standard plastering techniques and tools. May serve as either the finish coat or as a base coat for a following finish/color/texture. An acrylic sealer coat is offered with some systems to go on top of everything else.

NOTE: The names and exact number of layers will vary depending on the particular system you are using.

The following are directions for the use of one particular system. Each system will be a bit different, but there are 4 main parts to all of the systems.

Insulation board.
Primer-adhesive mix.
Fiberglass mesh fabric.
Finish materials.

1. Mix 2 gallons of acrylic glue liquid, 1/2 gallon of water, 48 pounds of portland cement and 10 pounds of silica sand. Use a 1/2 inch drill mixer with plaster type mixer blade at a slow speed. This is the primer-adhesive material.
2. Glue insulation board to the base. Place a bead of the primer-adhesive around the perimeter of the board. The bead should be 1/4 to 1/2 inch high and about 2 inches wide. Cross bead the length about every 2 feet. Press the insulation board firmly to the base to make sure there is good contact all over. Butt all joints tightly.
3. Prepare the surface of the insulation board for the fiberglass mesh fabric. Use a stainless steel trowel to apply a 1/16" thick layer of the primer-adhesive on the surface of the installed insulation board.
4. Put the fiberglass mesh fabric over the adhesive material. Trowel from the center of the fabric to the edges to embed it in the adhesive. All ends must be lapped at least 2 1/2 inches. It must be all of one piece when in a corner. Be sure to avoid any wrinkles.
5. Let the fabric/adhesive layer cure before applying the finish coat.
6. Mix the finish coat material by following the manufacturer's directions. Apply a 1/16" layer using a trowel.
7. When dry, spray or use a roller to apply a pigmented acrylic sealer. This makes a uniform color and a watertight, self-cleaning surface.

NOTE: The finish materials can be troweled or sprayed. Floating or other plastering techniques can also be used to make other textures.

THE PRIMER-ADHESIVE

This material should not be stored at a temperature below 40° F. The temperature must be at least 40° F. when it is being used, and the temperature should be kept at 40° for 24 hours after installation of the system has been finished.

A common mix for the primer-adhesive uses one part portland cement to 1 part primer-adhesive material. The pot life for mixed primer-adhesive is much like that of ordinary plaster materials. Container should be kept closed when not in use. Small amounts of water may be added to maintain or improve workability.

ACRYLIC GLASS FIBER PLASTER

This material does away with the fiberglass mesh fabric part of installing a system. The fabric does not have to be used because a special plaster made with glass fibers mixed in the portland cement is used.

The acrylic glass fiber (AGF) plaster can be the finish coat. It can also be used as a base coat for any of several other finish coat materials. Apply the acrylic glass fiber plaster 1/4" to 3/8" thick. Use the scratch and double-back technique. Bring to a level surface. It is recommended that the last step be to apply a pigmented acrylic sealer coat.

RETRO-FITTING

Retro-fitting means putting exterior insulation on an older building. The techniques of installing the insulation and surface finish are the same for both new and old construction. But one thing to remember is that the adhesives used to install the insulation board will not stick to all surfaces.

Some surfaces may need to have a lath installed over them. Examples of surfaces that can make this problem are: Plywood, metal siding, asphalted materials, painted surfaces, masonite and surfaces with hot spots. If you have any questions, you should check with the manufacturer of the system you are using.

You can also run a test for yourself. Cover about 1 square foot of the questioned surface with the system you will be using. Let the test section dry for at least 3 days. Then remove the test section.

If a layer of the insulation board sticks to the surface, the test is a success. If the material that the insulation board was put on delaminates, or if the insulation board does not stick to the surface, then the test was a failure.

The following materials will usually work if all steps are followed. Any special manufacturer's recommendations must be followed in all cases.

Masonry

All old masonry surfaces should be washed with a masonry cleaner. Flush with clean water.

Exterior Grade Gypsum Board Products

Must be of the grade and must meet the Federal specifications recommended by the manufacturer. Paper covering must be firmly bonded to the gypsum core.

Concrete Block

Must be clean and plumb. The surface cannot have any irregularities of more than 1/4 inch.

Slab Concrete

May need to be acid washed if there are any chemicals leeching from the concrete. You may want to test a section to be sure.

Terra Cotta and Brick

Similar to concrete block. The surface cannot have any irregularities of more than 1/4 inch.

Stucco

Should not be a painted surface. Make sure the stucco material is sound. Wash to remove dirt and any loose materials.

Glazed and Other Non-absorbing Surfaces

The surface should be clean. Prime with a 1/16" coat made by mixing 2 parts primer-adhesive to 1 part portland cement. Allow coat to dry at least 2 days before installing the insulation board.

Horizontal Surfaces

Do not use on horizontal surfaces of any kind. There must be a minimum slant (or "pitch") of 6" in each 12". Standing water will damage the materials.

INDIVIDUALIZED LEARNING SYSTEMS

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. Exterior insulation is ______________ saving and ______________ conserving.

2. The finish coat is about ______________ inch thick.

3. Insulation panels have to be fitted very ______________ together.

4. Terra cotta, brick and concrete block surfaces cannot have any irregularities greater than ______________ inch.

5. New systems use materials that can be worked like ______________.

6. As an exterior insulation, new systems can save interior ______________.

7. When embedding the mesh fabric, work from the ______________ to the ______________.

8. New systems materials should not be used on ______________ surfaces.

9. A ______________ mesh fabric is ______________ in the primer-adhesive.

10. The systems can be retro-fitted to ______________ buildings.

11. The primer-adhesive should not be stored below ______________.

12. List the 4 main parts to all of the new systems.

____

____

____

____

Self Assessment Answers

1. Cost, Energy
2. 1/16
3. Tightly
4. 1/4
5. Plaster
6. Space
7. Center, Edges
8. Horizontal
9. Fiberglass, Embedded
10. Older
11. 40 degrees F.
12. Insulation board
    Primer Adhesive mix
    Fiberglass mesh fabric
    Finish materials

Job Sheet

COMPLETE THE FOLLOWING TASKS.

Materials: Supplies, tools and materials to install and finish an insulation system.

1. You will install and finish a surface using new systems materials. The surface area should be at least 4 feet by 8 feet and use at least 2 pieces of insulation board.
2. Read the manufacturer's directions for the system you will be using.
3. Describe what you will do in the space below.
4. Install and finish, using the new systems materials.

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ If a horizontal surface has a pitch of 6" in each 12", the new systems materials cannot be used.

2. ____ The fiberglass mesh fabric is stapled to the insulation and the primer-adhesive is troweled over it.

3. ____ The new systems use different materials, but they are worked with the same tools and techniques.

4. ____ The pot life of mixed primer-adhesive is much longer than ordinary plaster materials.

5. ____ Stucco is one of the 4 main parts of a new system.

6. ____ The fiberglass mesh fabric is used to trap heat in the insulation.

7. ____ Slab concrete cannot be used as a base for new systems materials.

8. ____ It is more important to get the fiberglass fabric embedded quickly than it is to avoid wrinkles in the fabric.

9. ____ New systems can be used to insulate and save space on the inside of a building.

10. ____ Finish materials are one of the 4 main parts of a new system.

11. ____ Panels can be prefinished or finished on the job.

12. ____ Finish materials can be troweled, sprayed, floated or textured.

13. ____ Insulation board is one of the 4 main parts of a new system.

14. ____ Acrylic glass fiber plaster can be applied without using the fiberglass mesh.

15. ____ Insulation board is available in special corner shapes.

Instructor Post Assessment Answers

1. F
2. F
3. T
4. F
5. F
6. F
7. F
8. F
9. T
10. T
11. T
12. T
13. T
14. T
15. T

10

LOADING THE HAWK AND LOADING THE TROWEL

Goal:

The student will demonstrate the correct technique for placing material on and taking material off a hawk.

Performance Indicators:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

INDIVIDUALIZED LEARNING SYSTEMS

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Information section. This section will give you the information you need to understand the subject.

4. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

5. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

6. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

The plasterer uses two main tools to apply plasters. These tools are the hawk and the trowel. The hawk is used to hold a small, "working" amount of the plastering material. The trowel is used to put the plastering material onto the base surface.

There are many wrong ways to use the hawk and trowel. The ways are "wrong" because they don't make things easy. This module will help you learn the right (and easy) way to put plastering material on the hawk and how to load the trowel.

Supplementary References

1. Van Den Branden, F. and T. Hartsell. Plastering Skills and Practice. 1971. pp. 216-218.

2. Incentive Apprenticeship Training for Plasterers. Unit 3. National Association of Homebuilders. 1979. pp. 1-2.

Information

PRACTICE PLASTER WON'T GET HARD

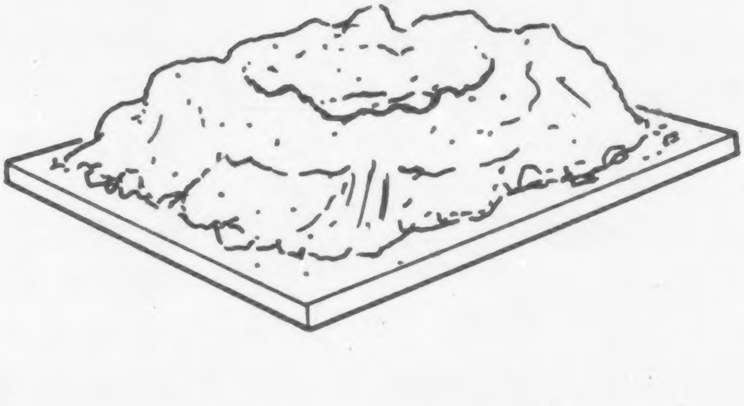
Practice loading the hawk and loading the trowel can be done with practice plaster. It is made by mixing together:

3 parts sand
1 part lime
Enough water to make a workable mix.

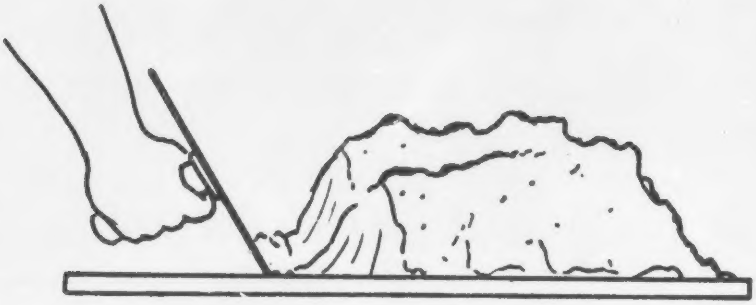
Lime by itself does not get hard. The lime and sand mix may dry out, but more water makes it soft again. This practice plaster can be used over and over. When the mix dries out, just add more water to make the mix soft again.

LOADING THE HAWK

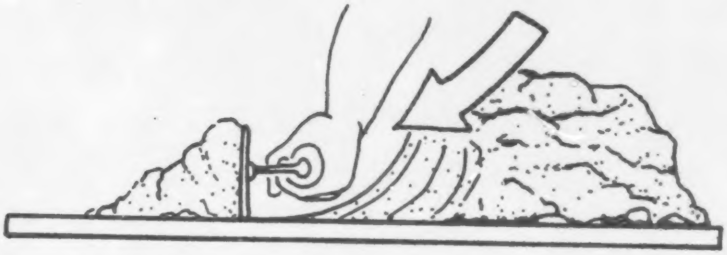
1. Scoop some mortar onto the mortar board.



2. Hold the hawk at an angle to the mortar board. You can rest the handle of the hawk on the mortar board.

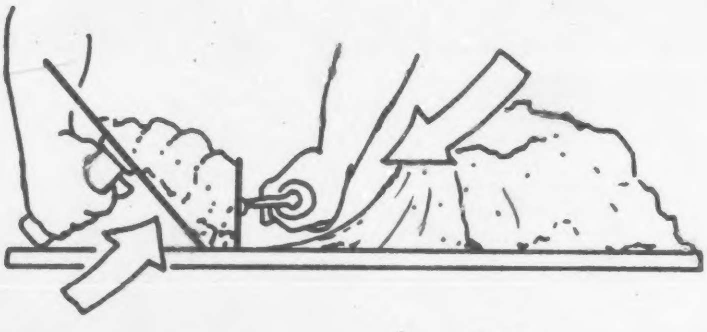


3. Use the trowel to cut a part of the mortar.

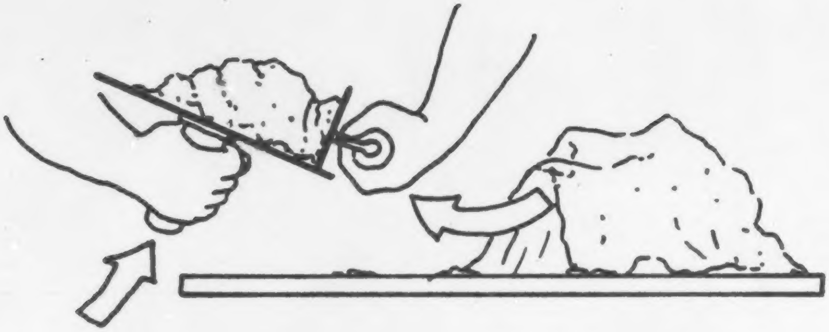


4. Move the hawk and trowel toward each other. The trowel is used to push the mortar that has been cut off. The hawk is moved toward the trowel at the same time.

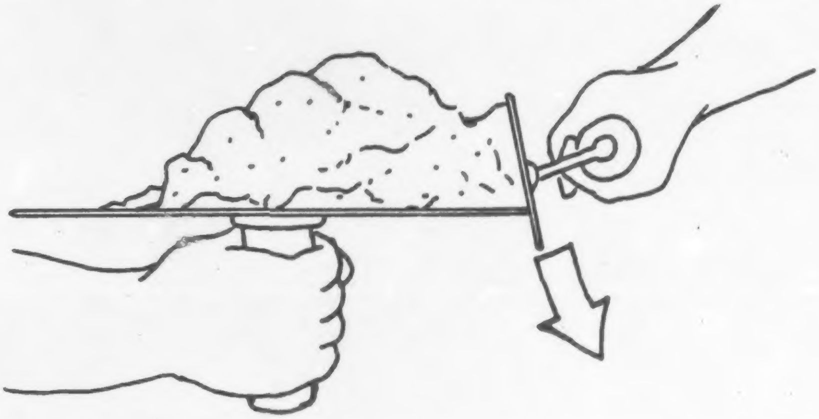
5. As the hawk and trowel meet, push the mortar onto the hawk.



6. As a part of the motion in step 5 lift the hawk and trowel off the mortarboard.

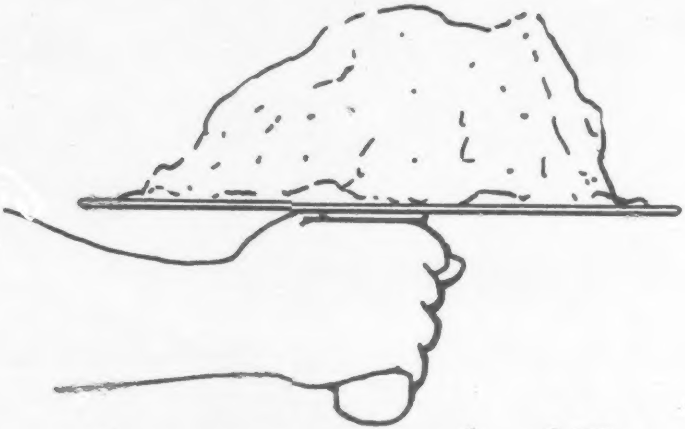


7. While you are lifting them off the mortarboard, bring the trowel down (back toward the mortarboard). This movement cleans off the trowel.



NOTE: Some plasterers save their strength by resting the handle of the hawk on the mortarboard.

8. Center the mortar on the hawk.



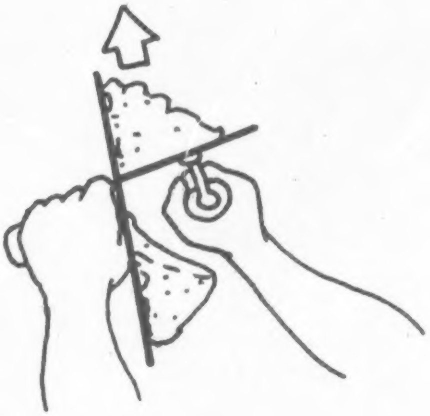
NOTE: When the mortar is centered, the weight on the hawk should push straight down. If the hawk wants to lean to one side, the mortar is not centered. There is too much mortar on the heavy side.

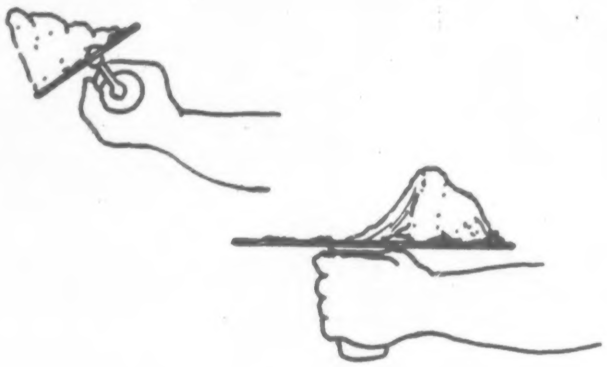
LOADING THE TROWEL

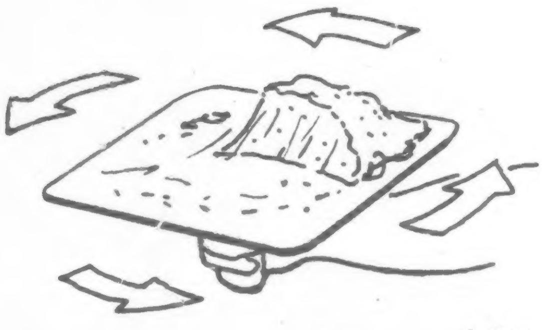
The "trick" here is to use the hawk to put mortar on the trowel.

Tip the hawk as shown. Then cut a trowelful of mortar from the point farthest way from you. Bring the hawk back down to a level position, leaving the trowel in place. You are using the hawk to place mortar on the trowel.

After you bring the hawk down, turn it 1/4 turn. You are now ready to put another trowelful of mortar on the trowel. Turning the hawk before cutting more mortar helps keep the mortar in the center. The hawk is easier to handle when the mortar is kept centered.







Self Assessment

THE FOLLOWING STEPS FOR PUTTING PLASTERING MATERIAL ON THE HAWK ARE NOT IN THE RIGHT ORDER. NUMBER THE STEPS IN THE RIGHT ORDER.

____ Push mortar onto hawk.
____ Scoop mortar onto mortarboard.
____ Bring the trowel down.
____ Move hawk and trowel toward each other.
____ Center mortar on hawk.
____ Hold hawk at an angle to mortarboard.
____ Lift hawk and trowel off mortarboard.
____ Use trowel to cut a part of the mortar.

NUMBER THE FOLLOWING STEPS IN THE RIGHT ORDER FOR PUTTING PLASTERING MATERIAL ON THE TROWEL.

____ Bring hawk back down to level position.
____ Tip the hawk.
____ Turn hawk 1/4 turn.
____ Cut mortar from point farthest away.

Self Assessment Answers

5

1

7

4

8

2

6

3

****

3

1

4

2

Job Sheet

COMPLETE THE FOLLOWING TASKS.

Materials and Tools

practice plaster
mortarboard
hawk
trowel

1. Mix practice plaster as directed by your instructor.
2. Practice the steps listed in the information section until you can work without thinking about it.
3. Ask your instructor to supervise you in the Post Assessment Activity.

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ The mortarboard is used to cut mortar.

2. ____ Lime by itself will get hard and can't be used over again.

3. ____ When taking mortar from the hawk, use the trowel to cut at the point farthest away.

4. ____ When putting mortar on the hawk, the hawk stays still and the trowel pushes it on.

5. ____ The weight of the centered mortar pushes straight down.

6. ____ While loading the hawk, do not rest the handle on the mortarboard.

7. ____ The hawk is not easier to handle when the mortar is kept centered.

8. ____ The two main tools of the plasterer are the hawk and the trowel.

9. ____ The last step of putting mortar onto the trowel is a 1/4 turn of the hawk.

10. ____ To reuse practice plaster, just remix with more water.

11. ____ The hawk is used to put mortar on the trowel.

12. ____ The wrong ways of using a hawk and trowel are wrong because they don't make things easier.

Post Assessment Activity

Demonstrate the loading of the hawk and the loading of the trowel for your instructor.

Instructor Post Assessment Answers

1. F
2. F
3. T
4. F
5. T
6. F
7. F
8. T
9. T
10. T
11. T
12. T

#11

PATCHING CRACKS AND HOLES

Goal:

The student will be able to identify the steps in patching simple cracks and holes and will execute those steps to trade starndard.

Performance Indicators:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Vocabulary section. Vocabulary words are important for a good understanding of the trade. After you have studied the vocabulary, ask your teacher to quiz you on the words and their meanings.

4. ____ Study the Information section. This section will give you the information you need to understand the subject.

5. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

6. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

7. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

It's best not to have any cracks in a plaster surface. But the best does not always happen and then there are cracks that have to be patched. Holes can be caused by accidents or by vandals. But whatever the cause, they too have to be patched.

This module will help you learn how to patch holes and cracks. There is also some information on the types of common cracks and what can cause them.

Vocabulary

Trade terms are very important for a good understanding of the trade. Study these words and meanings. When you have learned them, ask your teacher to quiz you on the words and their meanings.

RETEMPERING--Stucco goes through two stages. In stage 1, it appears to set. In stage 2, it does set. Stucco may be remixed to soften it before or during stage 1. This is called retempering. Do not add water. This will weaken the stucco. Stucco in stage 2 cannot be retempered.

*Sometimes a small amount of water is necessary to retemper stucco, especially in hot weather when water evaporates very fast.

Supplementary References

1. Gypsum Construction Handbook. United States Gypsum Co., 1978. pp. 365-367.
2. "Unit 8: Repairs." Incentive Apprenticeship Training for Plasterers. National Homebuilders Association, 1979. pp. 3-6.

Information

PATCHING SMALL CRACKS

1. Use a knife or chisel to remove any loose plaster in the crack.
2. Apply a liquid bonding agent in the crack and on the edges.

   NOTE: If you wet the crack with water instead of using a bonding agent:

   a. Wet it 3 or 4 times before applying plaster.
   b. Proper wetting is very important.
   c. A small painter's brush will work well.
3. Fill the crack with a good finish coat.

   NOTE: If using the wetting method, plaster should be mixed to set fast. You do not want the old plaster to draw too much moisture out of the patch mix.

   WARNING: A common mistake is trying to fill too many holes at one time. To keep the mix strong, it should be used quickly and without retempering.
4. When patching is done:

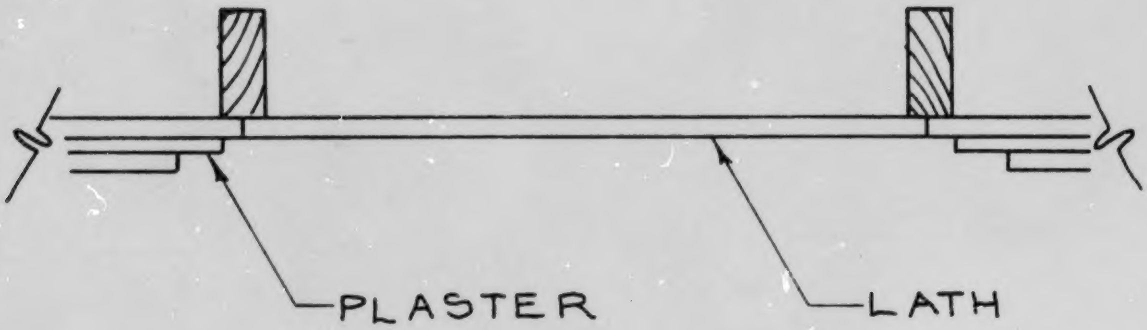
   a. Wash area with clean water.
   b. After this dries, remove dust with a clean rag or steel wool.

PATCHING MEDIUM CRACKS

1. Remove plaster down to the lath or masonry and out about 6" on each side of the crack.
2. Firmly attach a strip of metal lath in the cleared area.
3. BEST METHOD: Apply liquid bonding agent. Or, use water to wet the old plaster.

   CAUTION: Do not wet gypsum or insulation board lath when reapplying the base coat.
4. When patching, try to lap or "step" each part.

   (See the illustration on the next page.)



5. When finishing, make sure the finish coat looks the same as the surface around it. A flat patch on a textured surface is easy to see.

   NOTES:

   a. Repairs to veneer plasters are much like the repairs to regular gypsum plaster.
   b. Large cracks are most likely made by some structural problem. The structural problem has to be fixed before the crack can be fixed.

FOR ALL EXPOSED AGGREGRATE REPAIRS

1. Wash and clean the whole area. This will help in color matching.
2. Check color of aggregate and patching cement.
   a. Use a trial run if you can.
   b. Allow it to totally dry (use artificial dryer) to see how it looks.
3. Cut and pry out the damaged part. Make the patch area into a rectangle.
4. Apply tape to edges of the cut.

To Patch Non-troweled-on Aggregate

5. Apply the mix that will hold the aggregate.
6. The mix should be below the area around the patch.
7. Strip the tape; seed the aggregate; finish the patch.

To Patch Troweled-on Aggregate

5. Apply mix with aggregate in it.
6. Make it level with the area around the patch.
7. Strip the tape when the patch is setting and finish with a clean trowel.

PATCHING WITH PORTLAND CEMENT PLASTER

1. Clean out the area to be patched, making it into a rectangle.
2. The surface should be rough and clean.
3. Coat all of the patch area with a liquid bonding agent.
4. Patch mix should be much like regular portland cement plaster.
    a. Use as little water as possible to help stop shrinking.
    b. A mix that is too "rich" (too much cement) will be likely to shrink.
    c. An admix can be used to help stop shrinking and to make the patch stick.
    d. Accellerator may be used to stop shrinking and assure good bond and cure; also cuts the time necessary to patch.

5. BEST METHOD: Apply patch mix in several coats.
    a. Cure between coats.
    b. Dampen before adding the next coat.
6. A monolithic (all at one time) patch can also be applied.
    a. Use as little water as possible.
    b. Give it a good cure to help stop shrinking.

REPAIR OF SMALL HOLES

Examples: Nail holes, furniture dents, etc.

1. Clean away all loose plaster down to the lath all around the hole.
2. Apply a liquid bonding agent all around the hole (or wet with water).
3. Repair by filling hole with a good finish coat mix.

    NOTES:

    a. Review steps for repairing small cracks and follow as needed.
    b. A fiber admixture may be used if needed for extra body and holding strength; use fastest setting material possible.

REPAIR OF HOLES IN METAL LATH

1. Clean down to the lath all around the hole (as you do for repairing medium cracks).
2. Firmly attach a piece of metal lath cut to size.
3. Coat plaster edges around the hole with a liquid bonding agent.
4. Repair, following steps for medium cracks.

REPAIR OF HOLES IN BOARD LATH

1. Clean down to the lath all around the hole (as you do for repairing medium cracks).
2. Cut around the hole to remove damaged lath. Make the hole a rectangle.

To Repair with Metal Lath

3. Firmly attach metal lath.
4. Follow steps for repairing hole in metal lath.

To Repair with Board Lath

3. Cut a piece of scrap lath to match the hole you have made.
4. Coat the edges of the hole and of the new piece with a liquid bonding agent.
5. Apply very fast setting plaster to edges of patch piece and insert in the hole.
   NOTE: A screw can be fastened into the patch piece to help you hold on to it or nail with head on back of lath.
6. When set, apply bonding agent and follow steps for filling a medium crack.

NOTE: The larger a hole is, the less likely it should be repaired. When damage to the lath is very bad, it may be better to replace the section of lath material. This is more likely to happen with board lath than metal lath.

DESCRIBING SOME CRACKS AND THEIR CAUSES

A. Cracks connected to each other at regular intervals (vertical and horizontal), often in a "stepped" pattern.

Causes:

1. Plaster too thin, not enough plaster grounds.
2. Weak plaster (due to dryout or slow set).
3. Too much aggregate.
4. Did not use metal lath at stress points.
5. Rough wood frame expanded.

B. Random pattern of fine cracks, often 1" to 3" apart ("shrinkage cracks," "crazing," "alligatoring," "chip cracks").

Causes:

1. Not enough gauging plaster (lime shrinking).
2. Not enough troweling while setting.
3. Finish applied too thick.
4. Base coat too wet or too dry (too little or too much suction).

C. Irregular pattern of fine cracks, often 6" to 14" apart ("map cracking").

Causes:

1. Finish coat applied too thick.
2. Final troweling not timed right.
3. Gauged lime putty was retempered.

D. Random pattern, often less than 12" apart ("map cracking," "shrinkage cracks," "fissure cracks").

Causes:

1. High suction of masonry base.
2. Not enough aggregate in base coat--slow set.
3. Dryout condition (drying too fast before setting).

E. Cracks at wall or ceiling angles.

Causes:

1. Thin plaster.
2. Reinforcing lath not used.

INDIVIDUALIZED LEARNING SYSTEMS

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. Washing and cleaning the whole area will help with ______________ matching.

2. For patching medium cracks, remove plaster down to the ______________ and out about ______________ inches on each side.

3. A common ______________ is trying to fill too many holes at one time.

4. Patch mix should be much ______________ regular portland cement.

5. Large cracks are most likely made by ______________ problems.

6. Do not ______________ gypsum board lath.

7. Apply a liquid ______________ agent in the ______________ and around the ______________.

8. Always use ______________ water.

9. When possible, make the patch area into a ______________ shape.

10. A ______________ patch on a ______________ surface is easy to see.

11. Use a knife to remove any ______________ plaster.

12. It is ______________ to use a liquid bonding agent.

13. Do not ______________ a stucco mix in stage 2.

14. If using the wetting method, plaster should be mixed to set ______________.

15. A portland cement mix that is too "rich" will be likely to ______________.

16. ______________ plaster can cause cracks.

17. Dryout is when the plaster ______________ before it ______________.

18. Metal lath at stress points can ______________ cracking.

19. Not enough ______________ while the plaster is setting can cause cracks.

20. Too ______________ or too ______________ suction can cause cracks.

Self Assessment Answers

1. color
2. lath, 6
3. mistake
4. like
5. structural
6. wet
7. bonding, crack, edges
8. clean
9. rectangular
10. flat, textured
11. loose
12. best
13. retemper
14. fast
15. crack
16. thin
17. dries, sets
18. prevent
19. troweling
20. little, much

Job Sheet

COMPLETE THE FOLLOWING TASKS.

1. Make repairs as directed by your instructor.

2. Before you begin, review this module and use the space below to describe what you will do when you are making the repair.

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ A small painter's brush can be used to apply water if the wetting method is used.

2. ____ Metal lath at stress points can cause cracking.

3. ____ Too much suction can cause cracks.

4. ____ It is better to cover up loose plaster than to make the crack bigger.

5. ____ Not enough troweling while the plaster is setting can cause cracks.

6. ____ Too little aggregate in the base coat can cause cracks.

7. ____ A liquid bonding agent is not as good as plain water.

8. ____ Dryout is when the plaster sets before it gets dry.

9. ____ Large cracks may be caused by structural problems.

10. ____ Too little suction can cause cracks.

11. ____ An admixture will not help stop shrinking.

12. ____ For medium cracks, remove plaster about 1 inch on each side of the crack.

13. ____ Thin plaster can cause cracks.

14. ____ Shrinking in a portland cement plaster patch might be from too much water.

15. ____ When patching, try to fill as many holes at one time as possible.

16. ____ Repairs to veneer are much like repairs to regular gypsum plaster.

17. ____ A portland cement plaster patch can be applied as a monolithic patch.

18. ____ When possible, make the area to be repaired into a circle.

19. ____ Dryout can cause cracking.

20. ____ The best way to prevent cracks is to make the finish coat extra thick.

Instructor Post Assessment Answers

1. T
2. F
3. T
4. F
5. T
6. T
7. F
8. F
9. T
10. T
11. F
12. F
13. T
14. T
15. F
16. T
17. T
18. F
19. T
20. F

SETTING DOTS AND SCREEDS

Goal:

The student will be able to explain the use of dots and screeds to make a surface plumb and the proper thickness throughout, and will demonstrate this on a wall surface.

Performance Indicators:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Vocabulary section. Vocabulary words are important for a good understanding of the trade. After you have studied the vocabulary, ask your teacher to quiz you on the words and their meanings.

4. ____ Study the Information section. This section will give you the information you need to understand the subject.

5. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

6. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

7. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

How do you make sure that the plaster is the same thickness in all parts of the surface?

If the surface changes only a small amount at a time, it can be very hard to see that change. But the end result can be very large.

For example, 1/16 of an inch does not seem like very much. If a surface were 1 foot long and the plaster were 3/16" thick on one end and 4/16" thick on the other end, it could be very hard to see the difference.

Now imagine a 10-foot wall. Also imagine that every foot the plaster gets 1/16 of an inch thicker. By the time you got to the end, there would be quite a difference: 3/16 inch to start and 12/16" (or 3/4") at the end! And it is very possible that the wall would "look" okay to your eyes.

This module will help you learn how to keep this horror story from happening. The plasterer uses "dots" and "screeds" to keep the surface the same thickness in all parts of the surface. This module will help you learn to use dots and screeds.

Vocabulary

Trade terms are very important for a good understanding of the trade. Study these words and meanings. When you have learned them, ask your teacher to quiz you on the words and their meanings.

PLASTER DOTS--Small spots of plaster. They tell how thick to make the plaster coat. They are used to help set screeds.

METAL DOTS--Metal strips used to help set the plaster dots.

SCREEDS--Bands of plaster used to set the thickness of the coat of plaster. The straightedge rides on the screeds when leveling the coat of plaster on the surface.

GROUNDS--Wood or metal strips near the floor and along window and door openings. They can be used as a thickness gauge (similar to screeds). They also give a strong edge to the plaster. Moldings and other finish materials may be nailed to them.

Supplementary References

1. Incentive Apprenticeship Training for Plasterers. "Unit 9: Basic Layout." National Association of Home Builders. 1979. pp. 8-11.

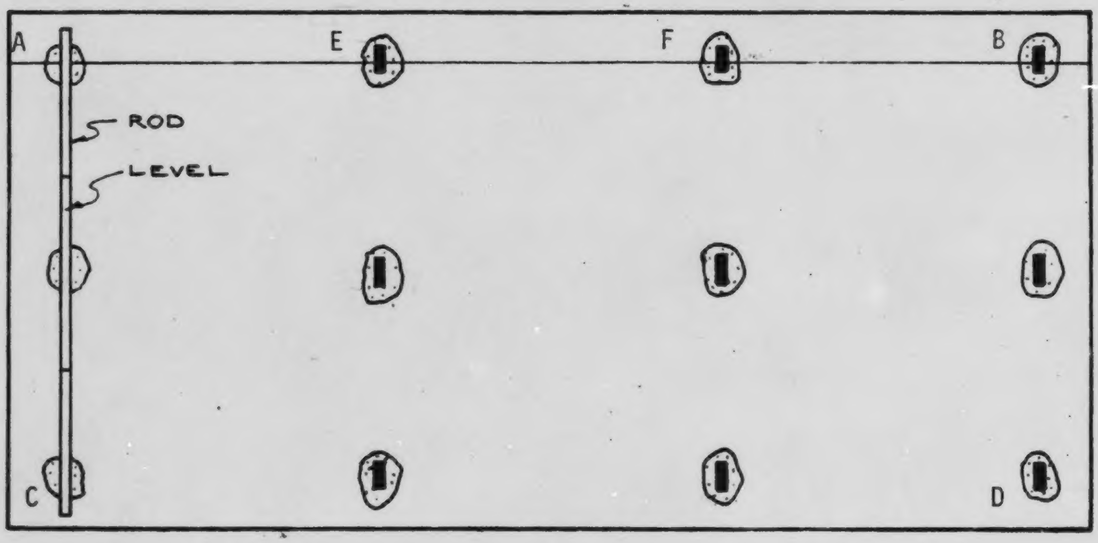
2. Gypsum Construction Handbook. United States Gypsum Company. 1978. pp. 249-50, 286-87.

Information

The dots are set as guides to make the screeds. There are 2 parts to the dots. The first part is a lump of plaster that is stuck to the wall. The second part is a metal dot. This metal dot is stuck into the plaster. It is taken out after the screeds are made.

The top surface of the metal dot is set at a distance out from the wall. This distance is how thick you want the coat of plaster to be. If you want a coat of plaster 3/4 inch thick, the distance from the top of the metal dot to the surface that will be covered must be 3/4 inch.

The first 2 dots you will put on the surface are the most important. They are the ones that will tell you where all the others will go. They are the ones that will tell you how thick to make the plaster. After all the dots are ready, they will guide you when you are making the screeds.



The first 2 dots you put on will be the ones in each upper corner as shown in the diagram. These are the dots labeled A and B. Make sure both of these dots will give you the thickness you want for the coat of plaster.

The next step is to fix dots (C) and (D). This is done by using the rod (also called a straightedge) and a level. (See the illustrations on the following page.)

Make sure that dots (C) and (D) are directly below dots (A) and (B). Put the rod on dot (A). Put a level on the rod. Now press on the bottom of the rod. This will push in the bottom dot. When the bubbles show that the rod is level, push just a little bit more. When the pressure on the rod stops, the dot will pop back out a bit.

A plumb bob and a gauge are used to check the bottom dot. The plumb bob is attached to a 2-inch block of wood.

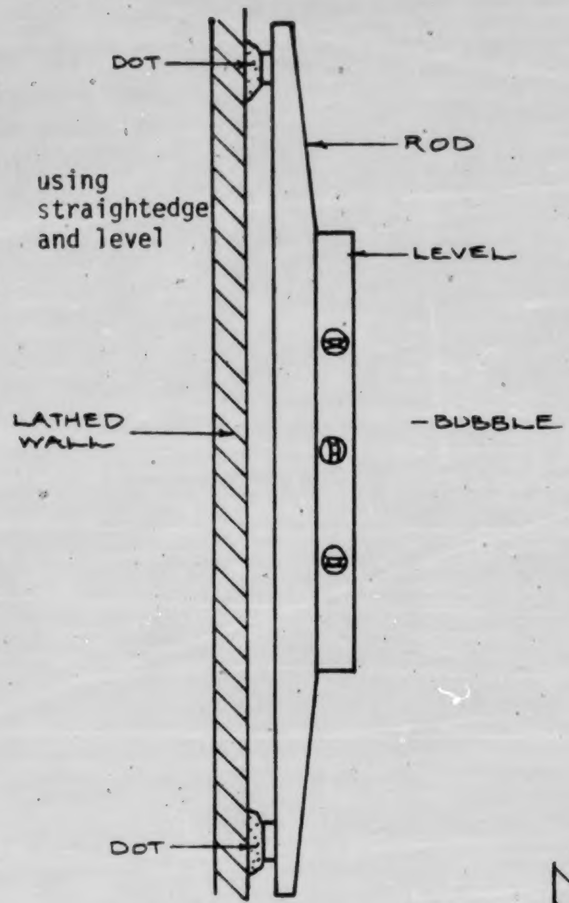
This block of wood is held against the top dot (A). The plumb bob line should go down past the bottom dot (C). The lower gauge has a 2-inch piece cut out. This gauge is placed on the lower dot. Push in on the dot until the line touches the 2-inch end of the cut out area. Repeat for dots (B) and (D).

The upper center dots (E) and (F) are the next step. String a tight line between dots (A) and (B). Place dots (E) and (F) behind the string. Push these dots toward the wall until they just barely clear the string. The dots should not touch the string. Set the lower center dots the same way.

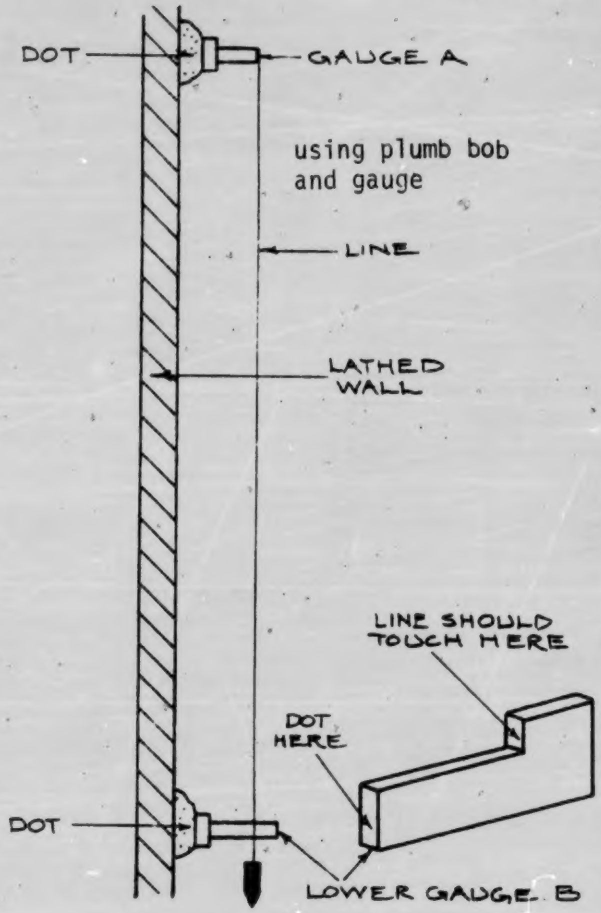
You will use the rod to set the center line of dots. Set a dot in the center of the wall between dots (A) and (C). Put the rod on the top dot. Guide it over the center dot and the bottom dot. Push on the lower end of the rod until that end touches the lower dot. This will make sure that all three dots are set flush with each other. Repeat to set the other dots.

MAKING THE SCREEDS

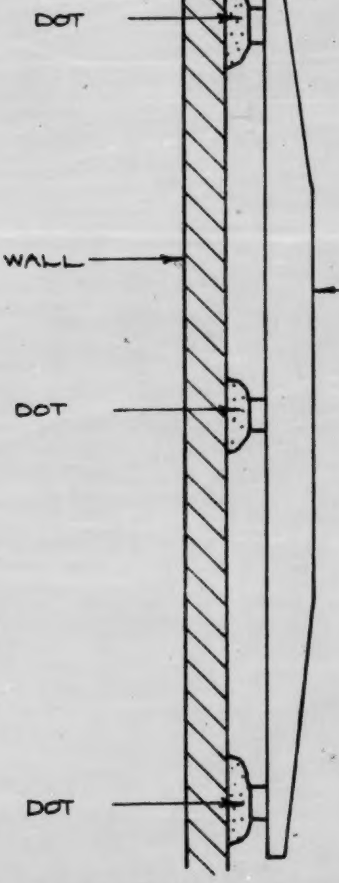
The screeds are bands of plaster. They work as guidelines for the straightedge when it is used while you are rodding. (Rodding is covered in another module.) After the dots have been set, 2 coats of plaster are applied to make the screeds.


DOT
ROD
LEVEL
LATHED WALL
BUBBLE
DOT

using straightedge and level

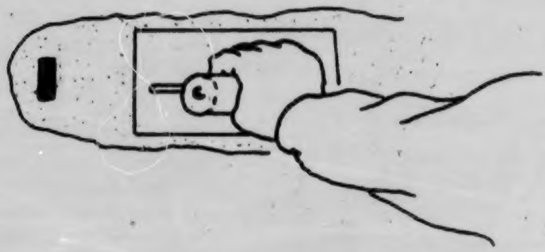

DOT
GAUGE A
LINE
LATHED WALL
LINE SHOULD TOUCH HERE
DOT HERE
DOT
LOWER GAUGE B

using plumb bob and gauge


DOT
WALL
ROD
DOT
DOT

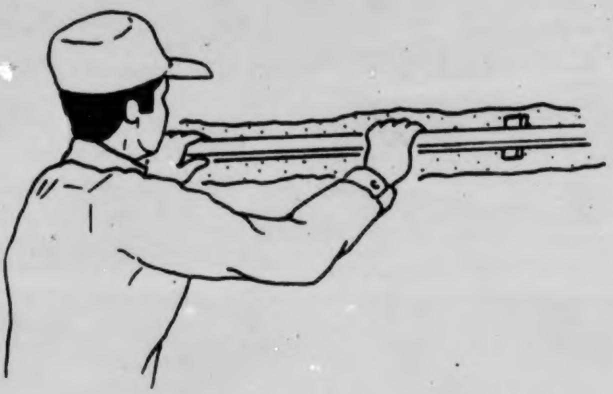
setting center dots

Apply the first coat between the dots. It should be about 1" wide.



The second coat is also 1" wide. It is brought out past the dots, but does not cover them.

The rod is used to check how level the screed is. Put each end of the rod on the metal dots.



Slowly rod the screed with a sawing action. Start at the bottom and work to the top. This will remove high spots. It will also let you see where the low spots are.

Fill in the low spots on the screed. Rod again.

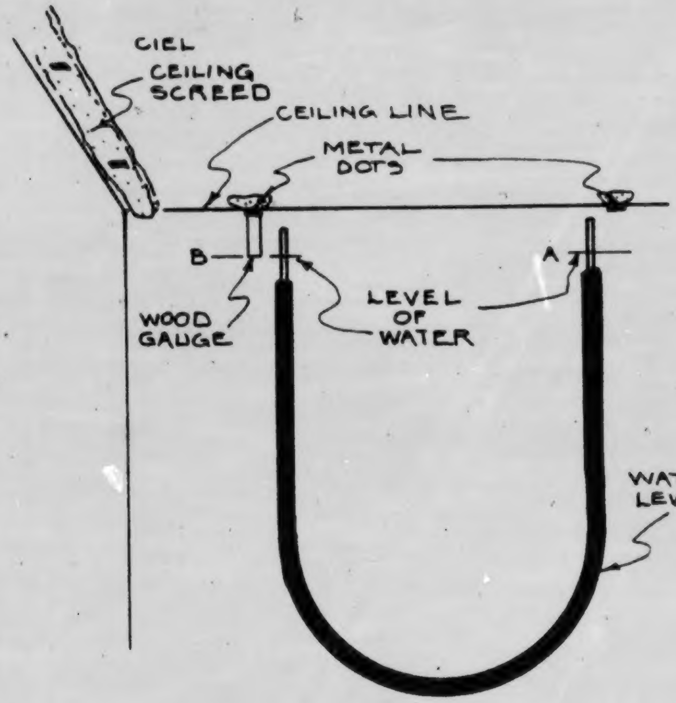
The last thing to do is to remove the metal dots and fill in the holes with plaster. You have now set your screeds for plastering a wall.

CEILINGS

A water gauge can be used to help set the dots for screeding a ceiling. It takes 2 people to use a water gauge.

The water flows through the tube connecting the 2 end pieces. The end pieces are clear glass or plastic. When the water in both end pieces is at the same level, then both end pieces are level with each other.

You can use the water gauge to mark the wall below where the dots will be put.



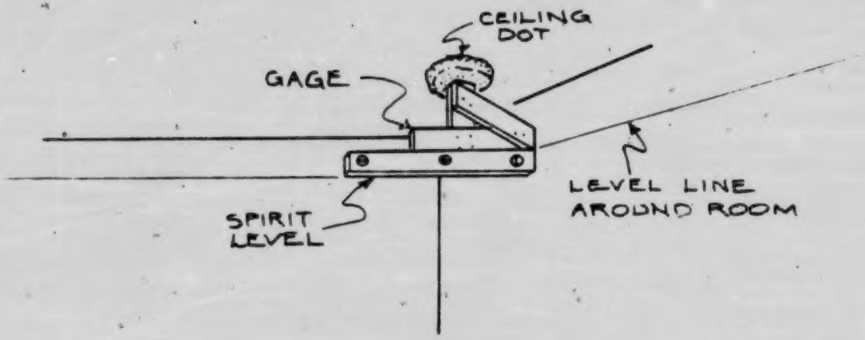
The wall is marked all around the room. You have to measure down from the ceiling. The distance you measure is the length of the wood gauge plus the thickness of the plaster coat you will apply.

This is your first mark. You line up the leveled water gauge with one end on this mark. The second mark is made by using the other end of the water gauge. Use the rim of the water line, not the center. The center of the water line will be lower than the rim.

Be sure to check the last mark made against the first mark you made. The water should end up level in both gauges when you make this measurement.

To set the dots, push up on the wood gauge until the bottom of it is level with the line on the wall. Then the dot will be set. Apply and level screed as you did for the wall surface.

NOTE: When you are moving around, plug the end pieces of the water gauge with your fingers. If any water gets out, the gauge is no longer accurate. Also, air bubbles in the water will make it inaccurate.


CEILING DOT
GAGE
SPIRIT LEVEL
LEVEL LINE AROUND ROOM

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. The screeds work as ______________ ______________ for the ______________ when it is used while you are ______________.

2. The ______________ and ______________ ______________ are used to check the bottom corner dots.

3. The water gauge is used to mark the ______________ below where the dots will be put on the ______________.

4. The dots work as ______________ to make the ______________.

5. A ______________ is used to set the center upper and lower dots.

6. The ______________ and ______________ are used to set the bottom corner dots.

7. To level the screed, rod it with a ______________ action.

8. A ______________ is used to set the center line of dots.

9. The distance from the ______________ of the metal dot to the ______________ that will be covered is the ______________ of the plaster that will be applied.

10. Screeds are applied in 2 ______________, each being ______________ inch wide.

Self Assessment Answers

1. guide lines, straightedge, rodding
2. gauge, plumb bob
3. wall, ceiling
4. guides, screeds
5. string
6. rod, level
7. sawing
8. rod
9. top, surface, thickness
10. coats, 1

Job Sheet

COMPLETE THE FOLLOWING TASKS.

Materials: Plaster, materials, tools needed to set dots and make screeds.

On a wall designated by your instructor, set dots and make the screeds. Repeat the process, using different thicknesses of dots, until you can do the job quickly, efficiently and accurately.

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ A plumb bob is used to check the center line of dots.

2. ____ The metal strips in the dots are covered over when the second coat is put on the screed.

3. ____ The rod is used to make the screeds level by scraping from the top to the bottom of each screed.

4. ____ The dots control how thick the screed will be.

5. ____ Air bubbles in the water gauge are used to make it more accurate.

6. ____ The screeds are made with two 3" wide coats of plaster.

7. ____ The first dots are not very important because you will set so many of them.

8. ____ The wall dots are set with a water gauge.

9. ____ The screeds are used to set the thickness of the dots.

10. ____ To set the ceiling dots, push up on the wood gauge until the bottom of the gauge is level with the line on the wall.

11. ____ There are 2 parts to a dot, a lump of plaster and a piece of metal.

12. ____ The screed controls how thick the plaster on the whole surface will be.

13. ____ The upper and lower center dots are set with a string guide line.

14. ____ When using the water gauge, go by the center of the water line, not the rim.

15. ____ A rod is used to set the center line of dots.

Instructor Post Assessment Answers

1. F
2. F
3. F
4. T
5. F
6. F
7. F
8. F
9. F
10. T
11. T
12. T
13. T
14. F
15. T

USING THE SCRATCHER TOOL

Goal:

The student will be able to identify the steps and demonstrate the correct use of a scratcher.

Performance Indicators:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Information section. This section will give you the information you need to understand the subject.

4. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

5. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

6. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

The base coat of plaster comes between the lath material and all other coats of plaster material. The base coat is the coat that holds all of the other coats onto the lathing. The other coats need a good base coat. So it has to be carefully prepared.

One step of preparing the base coat is to mark it with lines scratched into the coat of plaster. These lines will help the next coat that is put on to "hold" better. Marking with these lines is called "scratching," and it is from this that the base coat of plaster gets the name "scratch coat."

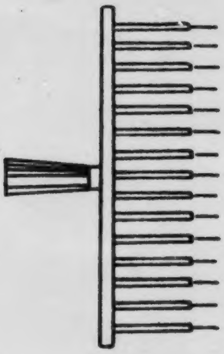
This module will help you learn how to use the plastering tool that makes the scratch marks in the plaster base coat.

Supplementary References

1. Van Den Branden, F. and Hartsell, T. Plastering Skill and Practice, 1977. pp. 258-271.

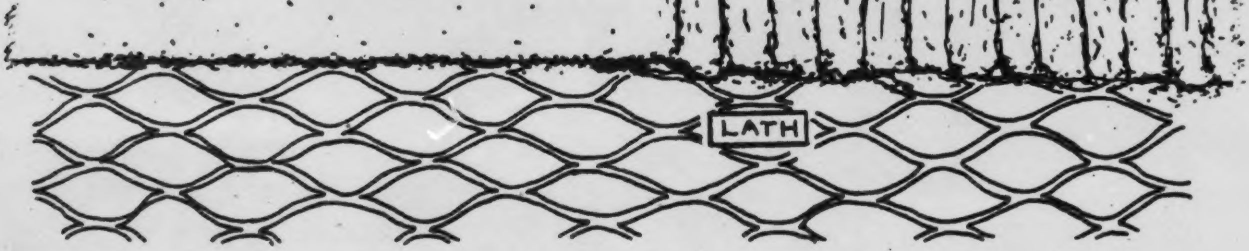
2. "Unit 5: Applying the Base Coat." Incentive Apprenticeship Training for Plasterers. National Association of Homebuilders, 1976. pp. 1-11.

Information



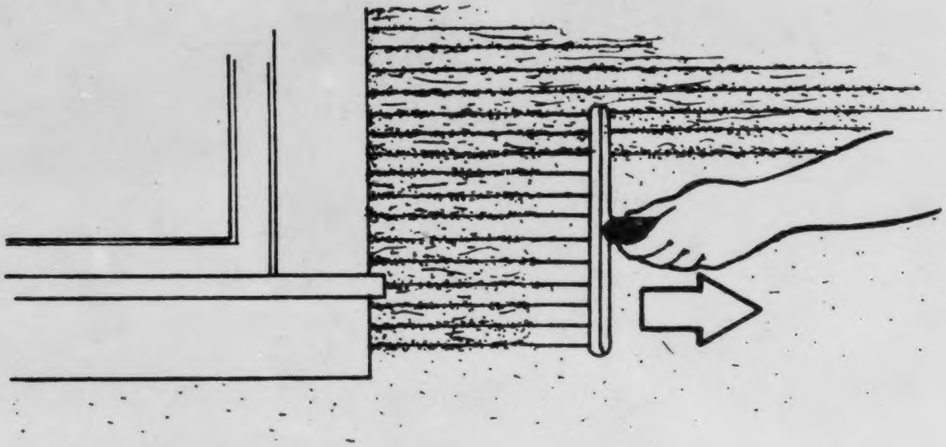
The scratcher is used to scratch a layer of unset plaster. The scratching makes a good surface for the next coat of plaster.

The scratcher can also be called a scorer, a scarifier or a rake. If you scar a surface, you are also scoring it, or scratching it, or raking it. The words all mean the same thing.

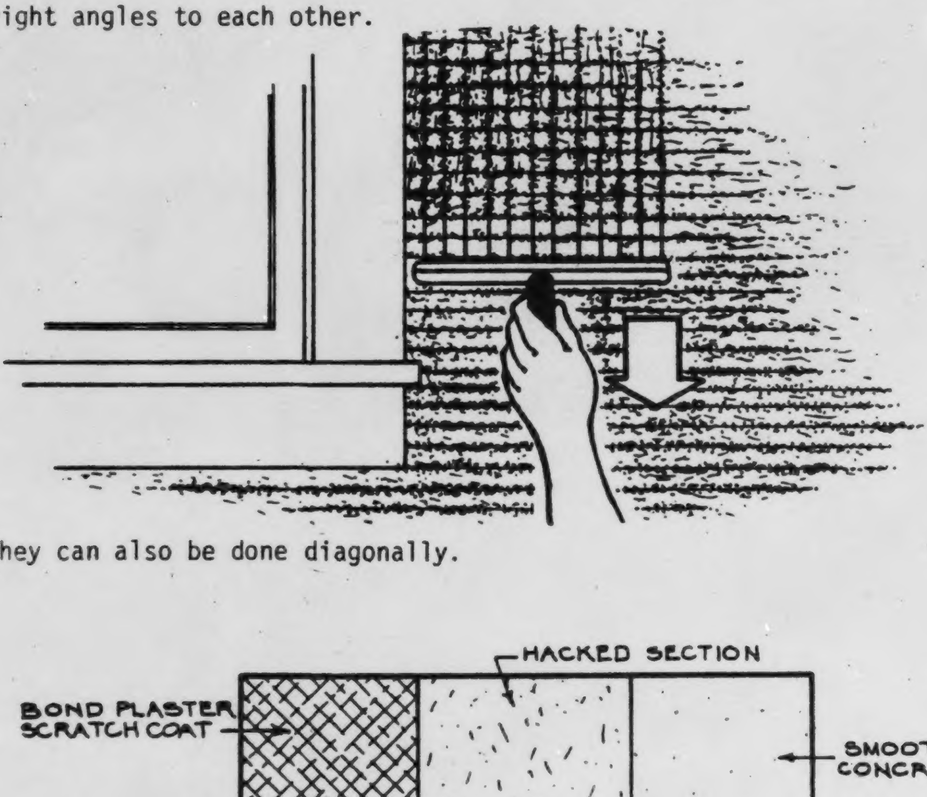


This section view shows the scratch, brown and finish coats.

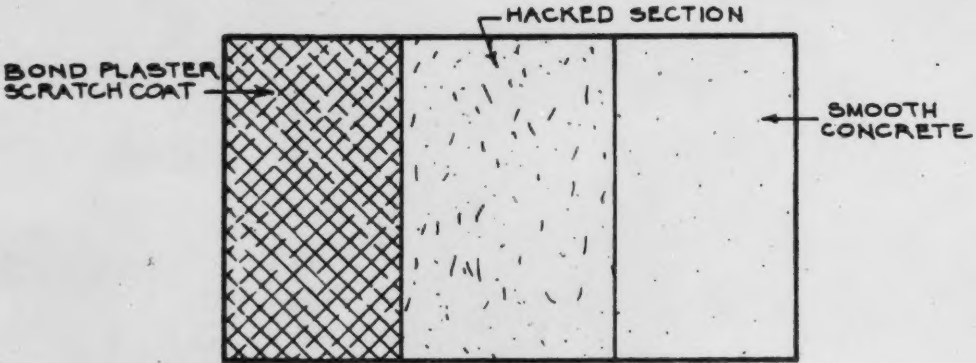
Scratch lines or marks can be made in one direction only.



The scratching can also be done in what is called "cross scratch." Cross scratch is two sets of scratch marks or lines. The sets of lines are made at right angles to each other.



They can also be done diagonally.


HACKED SECTION
BOND PLASTER SCRATCH COAT
SMOOTH CONCRETE

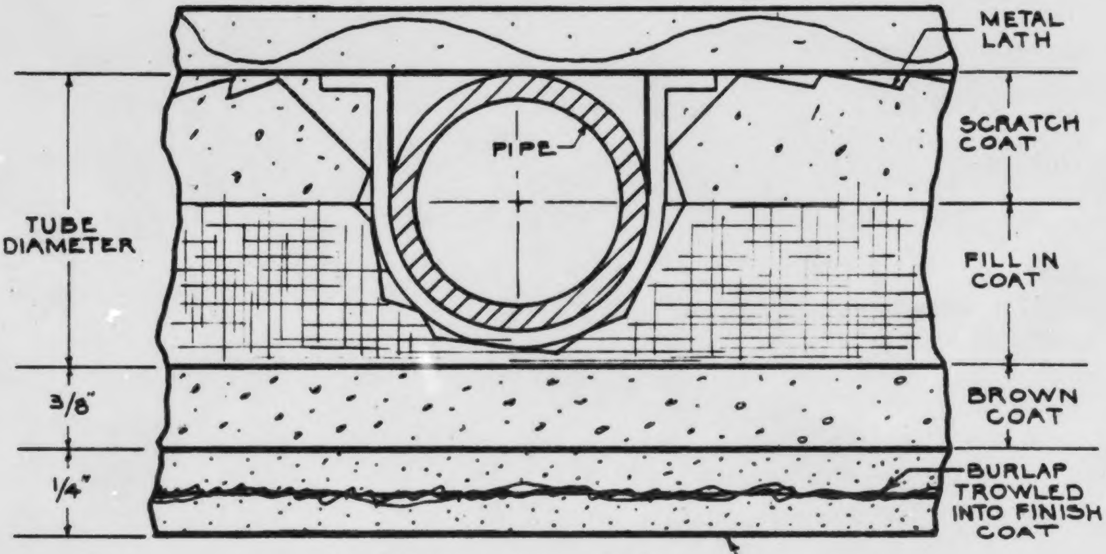
PREPARING CONCRETE

Ceilings are often only scratched in one direction. Interior gypsum plaster may be scratched either one time or cross scratched. It depends on the needs at the time. Stucco is usually cross scratched on both ceilings and walls.

Scratching to Make a Better Bonding Surface.

The scratch coat is the name of the first coat of plaster in a three-coat system. It is called the scratch coat because it is always scratched. But it is not the only coat of plaster that may be scratched.

The reason for scratching is to give the coat a very good bonding surface. When the plaster material is being used in special ways, this can make special needs for good bonding. One example of this is plastering a radiant heat system.


METAL LATH
PIPE
TUBE DIAMETER
SCRATCH COAT
FILL IN COAT
3/8"
BROWN COAT
1/4"
BURLAP TROWLED INTO FINISH COAT
FINISH COAT

CROSS SECTION OF HOT WATER RADIANT HEATING PANEL

A radiant heat system is often plastered with four coats of plaster material. When the plaster has to cover pipes that are used for heating, there are special needs that have to be met. These special needs for good bonding are met in part by scratching all three of the coats under the finish coat.

Using the Scratcher, Scarifier, Scorer, Rake.

1. Scratching is done before the plaster has set.
2. It is always done if a coat of plaster will set and dry before the next coat is applied.
3. Scratching is not done with veneer.
4. Scratching is a part of a three-coat plastering system.
5. Walls are scratched in a horizontal direction when they are not cross scratched.
6. A coat of plaster is scratched to make a better bonding surface. If there is no need for a better bonding surface, there is no need to scratch the coat of plaster.
7. Ceilings are often scratched in only one direction.
8. Stucco is often cross-scratched on ceilings and walls.
9. The most common way to cross scratch is to make the scratch marks meet at a 90° angle.
10. When coats of plaster are put on one right after the other, scratching may not be necessary if there is enough suction to bind the coats together.

How to Scratch a Surface. (You may want to change this a little to make it easy for you to do.)

1. Begin in a corner or on another "natural seam" in the plaster surface.
2. Use the scratcher to make a row of lines running all the way across the plaster surface.
3. Many plasterers begin at the highest point of the surface and work down to the lowest.
4. Repeat steps 1-3 until plaster surface is covered by rows of marks left by the scratcher.
5. WHEN CROSS SCRATCHING: Begin the second set of scratch marks after finishing the first set (steps 1 through 4). To make the second set of marks, follow the directions listed in steps 1-4 above.

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANK PROVIDED.

1. Scratching is done ______________ the plaster has ______________.

2. Scratching is ______________ done if a coat of plaster will ____________ and ______________ before the next coat is applied.

3. Scratching is not done with _____________.

4. Scratching is part of a ______________-______________ plastering system.

5. Walls are always scratched in the _____________ direction.

6. Plaster is scratched to make a ______________ bonding surface.

7. If you don't need a ______________ bonding surface, you don't need to ______________ the plaster.

8. Ceilings are often scratched in ______________ ______________ direction.

9. Stucco is often ______________ ______________ on both ceilings and walls.

10. The most common cross scratch is when the 2 sets of marks meet at an _______________ of ______________ degrees.

11. When coats of ______________ are put on one right after the other, scratching is not ______________ when there is enough ______________ to bind the ______________ together.

12. Begin scratching in a ______________ or other natural ______________.

13. Use the scratcher to make a ______________ of lines running ______________ the way across the plaster surface.

14. Many plasterers begin at the ______________ point of the surface and work ______________ to the ______________.

15. When ______________ ______________, begin the second set of scratch marks after ______________ the ______________ set.

IN THE WORDS BELOW, FIND AND CIRCLE THE 4 WORDS THAT MEAN THE SAME THING.

hatchet   scratcher   cutter   knife   rake   fork

ripper   seamer   scarifier   spoon   scorer

Self Assessment Answers

1. before, set
2. always, set, dry
3. veneer
4. three-coat
5. horizontal
6. better
7. better, scratch
8. only, one
9. cross, scratched
10. angle, 90
11. plaster, necessary, suction, coats
12. corner, seam
13. row, all
14. highest, down, lowest
15. cross, scratching, finishing, first

scratcher, rake, scarifier, scorer

Job Sheet

COMPLETE THE FOLLOWING TASKS.

Materials and Tools

plaster*
plastering tools
board lathing
metal lathing

1. Mix gypsum base coat plaster.*
2. Apply to board lath wall and cross scratch.
3. Apply to board lath ceiling and cross scratch.
4. Mix gypsum base coat with fiber admixture.*
5. Apply to metal lath wall and cross scratch.

*Practice Plaster may be used.

3 parts sand
1 part lime
Enough water to make a workable mix

Post Assessment

CIRCLE THE RIGHT WORD OR WORDS THAT WILL COMPLETE EACH SENTENCE.

1. Many plasterers begin scratching at the [highest/lowest] point of the surface.

2. When walls are not cross scratched, the marks should be made [vertical/ horizontal].

3. Begin scratching in [a corner/the center] of a room.

4. Scratching is used to [reduce/increase] the suction in a plaster surface.

5. Scratching makes a [good/neat/level] surface for the next coat.

6. Gypsum plaster ceilings are often scratched in [one/two] direction(s).

7. Scratching [is/is not] done in two coat systems of plastering.

8. A radiant heat system may have as many as [2/3/4/5/6/7] coats of plaster.

9. When scratching, make a row of lines [all the way/half way] across the plaster surface.

10. A scratch coat is part of a [2/3] coat system.

11. Scratch lines can be made in [one/two] directions.

12. The scratching has to be done [before/after] the plaster has [dried/set].

13. Stucco ceilings are often scratched in[one/two] directions.

14. The scratch coat [is/is not] the only coat that ever gets scratched.

15. Scratching is done with the [veneer gypsum/regular gypsum] system.

16. Cross scratch is [2/3] sets of scratch marks.

17. If you scar a surface, you are also [raking/pitting] the surface.

Instructor Post Assessment Answers

1. highest
2. horizontal
3. corner
4. increase
5. good
6. one
7. is not
8. 4
9. all the way
10. 3
11. two
12. before, set
13. two
14. is not
15. regular gypsum
16. 2
17. raking

13

APPLYING AND SPREADING PLASTER

Goal:

The student will demonstrate correct techniques for applying and spreading plaster with a hawk and a trowel.

Performance Indicators:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Vocabulary section. Vocabulary words are important for a good understanding of the trade. After you have studied the vocabulary, ask your teacher to quiz you on the words and their meanings.

4. ____ Study the Information section. This section will give you the information you need to understand the subject.

5. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

6. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

7. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

The hawk holds a working amount of plaster. The trowel holds a small amount of plaster. These tools do not put plaster on the walls. The tools do not know how to spread a thin coat or a thick coat of plaster. The tools do not know where to start. They don't know the difference between a base coat and a finish coat.

As a plasterer, you are the one who spreads the plaster material with your hawk and trowel. The tools will only do what you know how to do. This module will help you learn how to make the hawk and towel work for you when you spread the plaster.

Vocabulary

Trade terms are very important for a good understanding of the trade. Study these words and meanings. When you have learned them, ask your teacher to quiz you on the words and their meanings.

EXTERIOR--The outside of something (e.g., exterior house wall is the outside of a house wall).

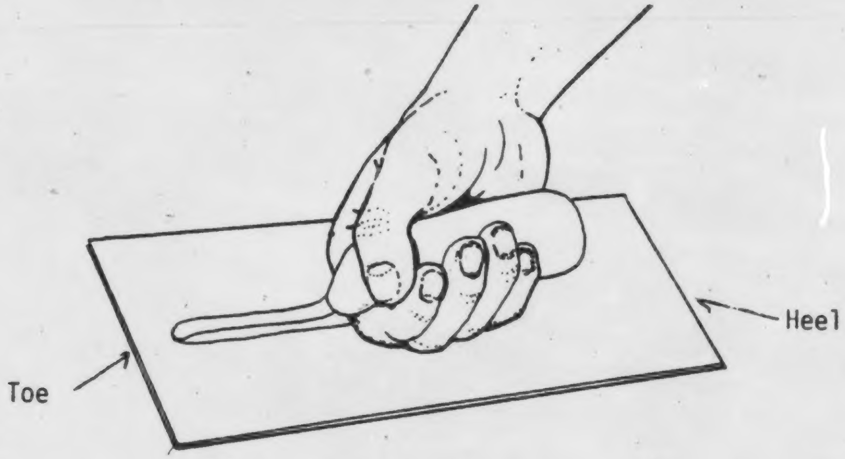
Supplementary References

1. Van Den Branden, F. and T. Hartsell. Plastering Skills and Practice. 1971. Chapter 6.

2. "Unit 6: Applying the Finish Coat." Incentive Apprenticeship Training for Plasterers. National Association of Homebuilders, 1979. pp. 10-19.

Information

NOTE: You may want to reread the module on loading the hawk and trowel.

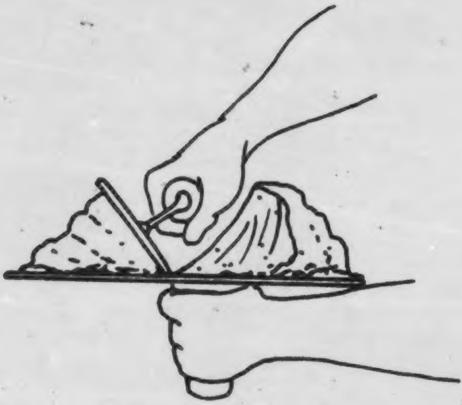


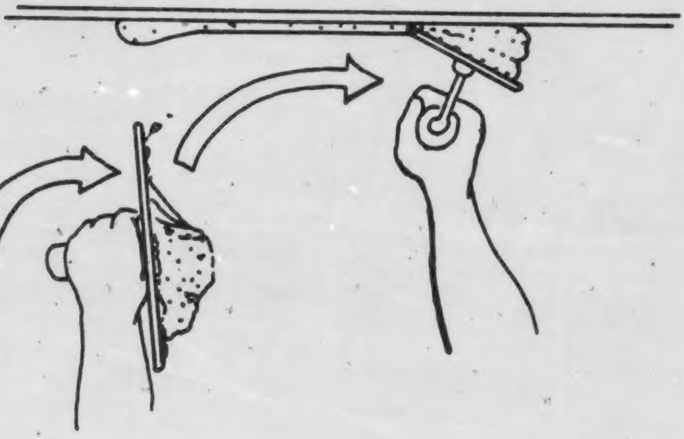
HOW TO HOLD THE TROWEL

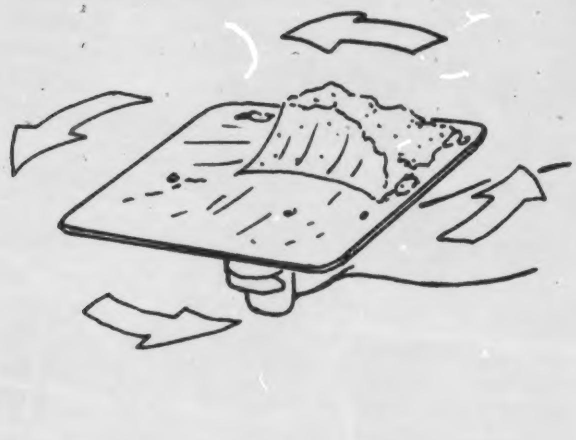
Putting Plaster On a Surface

1. Reach across hawk.
2. Cut mortar with edge of trowel.
3. As one smooth motion.
    a. Tilt hawk toward you (away from wall).
    b. Lift and twist trowel up and away from you.
    c. The hawk is used to put plaster on the trowel.
4. Bring down hawk and make a 1/4 turn.
5. Press trowel to wall or ceiling.
6. For a thick coat: Hold trowel flat against the surface.
7. For a thin coat: Hold trowel at an angle to the surface.

(See the illustrations on the following page.)



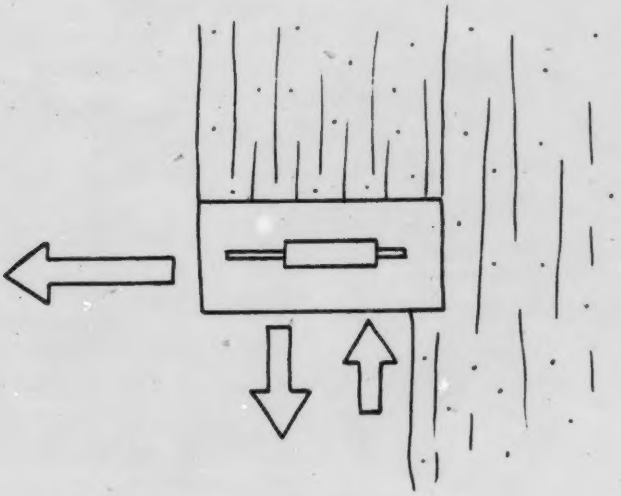




To Apply Base Coat

1. Use sweeping strokes and equal pressure.
2. Move from right to left.*
3. This movement from right to left is called, "moving from heel to toe." (Moving from left to right would be called, "moving from toe to heel.")
4. This method lets you work the plaster across the surface and leaves a fairly smooth surface behind that is not hard to rod.
5. Over lap the strokes a bit as you go.

*This is for a right-handed person. A left-handed person should reverse (do the opposite) all operations.

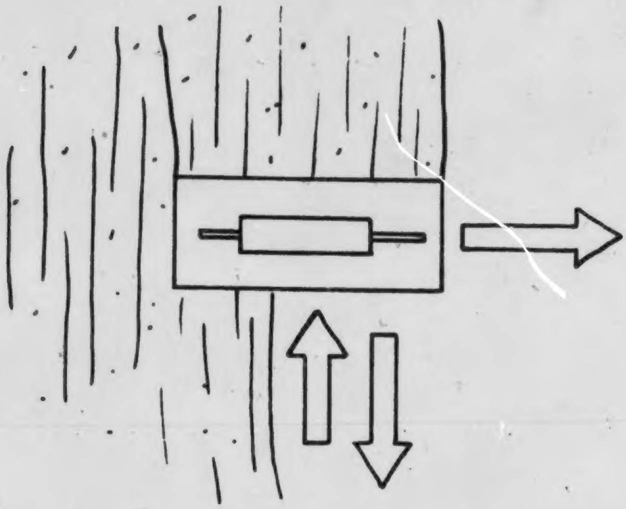


To Apply Finish Coat

1. Move from toe to heel to apply the finish coat.*
2. This is the opposite of applying the base coat. (The same steps are used as for the base coat, but directions of movement are reversed.)

*This is for a right-handed person. A left-handed person should reverse all operations.

(See the illustration on the top of the next page.)

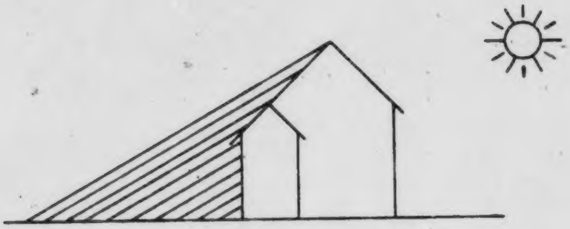


APPLYING THE FINISH COAT

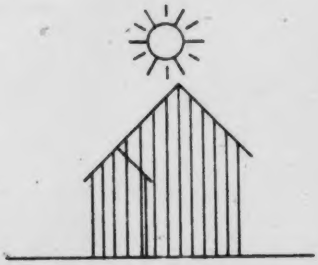
Stay in the Shade

When plastering the exterior of a building, plan your work--and your work day --so that you can work in the shade. This is to help keep the plaster from drying out before it sets.

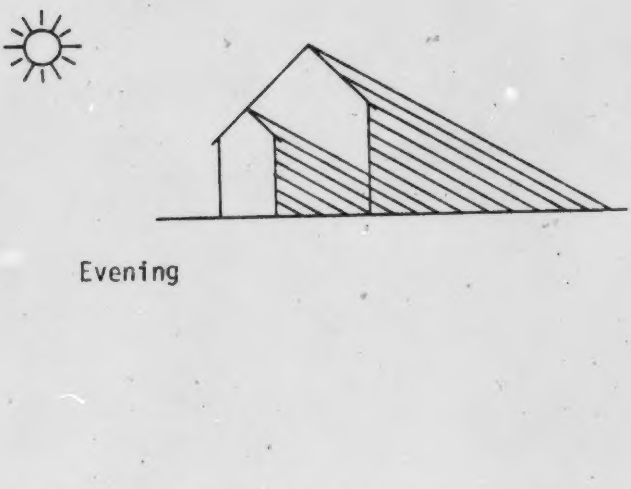
(See the illustration on the next page.)



Morning



Noon

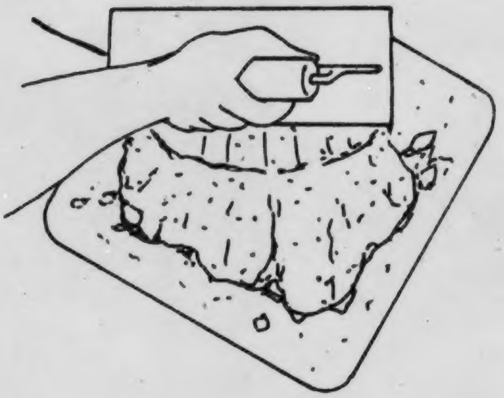


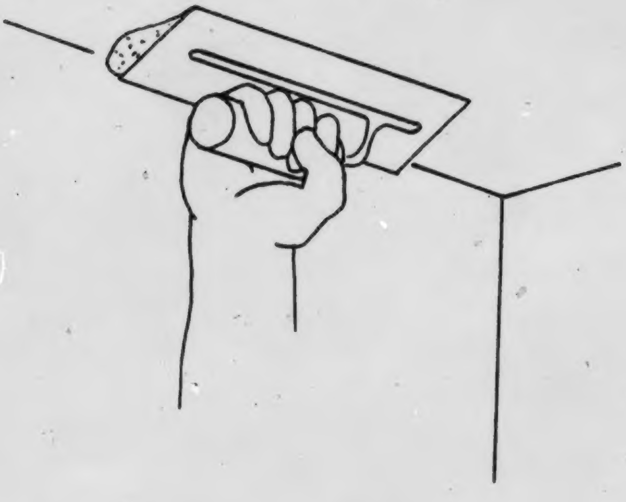
Evening

Using the Other Side of your Trowel

Sometimes it is easier to reach a place if you can put the plaster on the other side of your trowel. The following illustrations show an easy way to do this.

(See the illustrations on the next page.)





Self Assessment

ANSWER ALL THE QUESTIONS IN THE SPACES PROVIDED. THEN READ OVER THE MODULE TO SEE IF YOU MISSED ANYTHING. TO GRADE YOURSELF: START WITH 100 POINTS. SUBTRACT 2 POINTS FOR EACH THING YOU MISS.

1. Use your own words to tell how to take plaster from the mortarboard and put it on a wall.

2. Use your own words to tell how to apply a base coat.

3. Use your own words to tell how spreading a finish coat is not the same as spreading a base coat.

INDIVIDUALIZED LEARNING SYSTEMS

Job Sheet

COMPLETE THE TASKS BELOW.

1. Apply and spread plaster* on a surface that has been picked out by your instructor.

2. BEFORE YOU START: Use the space below to describe what you will do.

*Practice Plaster may be used:

3 parts sand
1 part lime
Enough water to make a workable mix

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK. (NO. 1-12)

1. ____ Toe to heel is the proper way for a right-handed person to put on a finish coat.

2. ____ Plaster should be applied with sweeping strokes and equal pressure.

3. ____ Exterior work is planned to work in the shade so the plaster will not dry before it has time to set.

4. ____ The direction in which plaster is spread is the same for both right- and left-handed persons.

5. ____ Moving from toe to heel on the finish coat compacts the plaster.

6. ____ When you are putting plaster on the trowel, the hawk is tipped toward the wall.

7.____ To apply a thick coat of plaster, hold the trowel flat against the surface.

8._____ Never overlap strokes when applying plaster.

9._____ A base coat is applied from toe to heel by a right-handed person.

Instructor Post Assessment Answers

1. T
2. T
3. T
4. F
5. T
6. F
7. T
8. F
9. F

RODDING AND DARBYING

Goal:

The student will be able to identify the steps for and demonstrate the use of a rod and a darby.

Performance Indicators:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

INDIVIDUALIZED LEARNING SYSTEMS

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Vocabulary section. Vocabulary words are important for a good understanding of the trade. After you have studied the vocabulary, ask your teacher to quiz you on the words and their meanings.

4. ____ Study the Information section. This section will give you the information you need to understand the subject.

5. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

6. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

7. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

This module will help you learn the proper way to use a rod and a darby to make a smooth, dense surface. You will also learn about trimming angles to make good corner lines.

Vocabulary

Trade terms are very important for a good understanding of the trade. Study these words and meanings. When you have learned them, ask your teacher to quiz you on the words and their meanings.

DARBY--Used to compact and smooth a plaster surface. Made with wood, metal-edged wood or all metal. A notched darby is available for undercoats. Dimensions: Approximately 1/4" thick, 3 1/2" wide, 45" long.

ROD--Also called a straightedge. Used to find low spots, straighten walls and ceilings. Available in nearly any length up to 8'.

Supplementary References

1. "Unit 5: Applying the Base Coat." Incentive Apprenticeship Training for Plasterers. National Association of Home Builders. 1979. pp. 23-25.

2. Plastering Skill and Practice. F. Van Den Branden. 1971. pp. 215-32.

Information

USING THE ROD

The rod is used to straighten the surface. It is used to find low spots and to scrape off high spots. The darby will do these things also. When using either, hold the tool at a slight angle.

Do the ceiling first. Then work the top of the wall. Then work the bottom of the wall. Fill in low areas and continue rodding until surface is level.

Work the corners first. Then work the surface areas. Plaster cut off the wall by the rod can be used to fill low spots or put back on the mortar board.

The Corners

Put the rod in the angle and pull it out carefully. Work both sides of the corner. Repeat as often as you must to leave a true, flat surface.

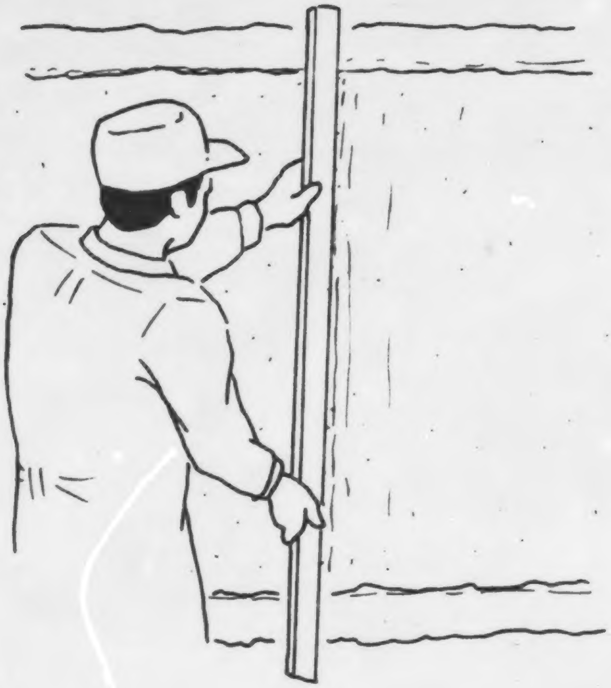
The Surface Areas

Put the rod on the screeds and move across the surface. When filling in hollow spots, do not "rob" nearby areas that are level. Use plaster from the mortarboard or that is on the rod to fill low areas.

The passes with the rod should overlap each other by about 1/2 the length of the rod. A good thing to remember when you are applying a coat of plaster is that it is better to leave a few low areas than to have too much plaster. All the extra plaster you put on will just have to be scraped off again.

When you are using the rod, be sure to hold your hands about 3 feet apart. If your hands get closer together, you risk letting the rod bend.

(See the illustration at the top of the following page.)



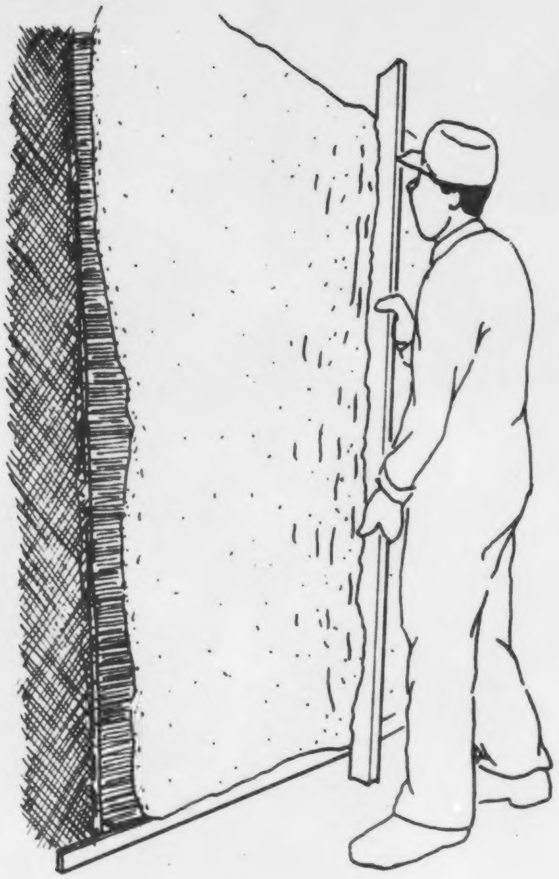
Keep on filling low spots and rodding until you get a level surface.

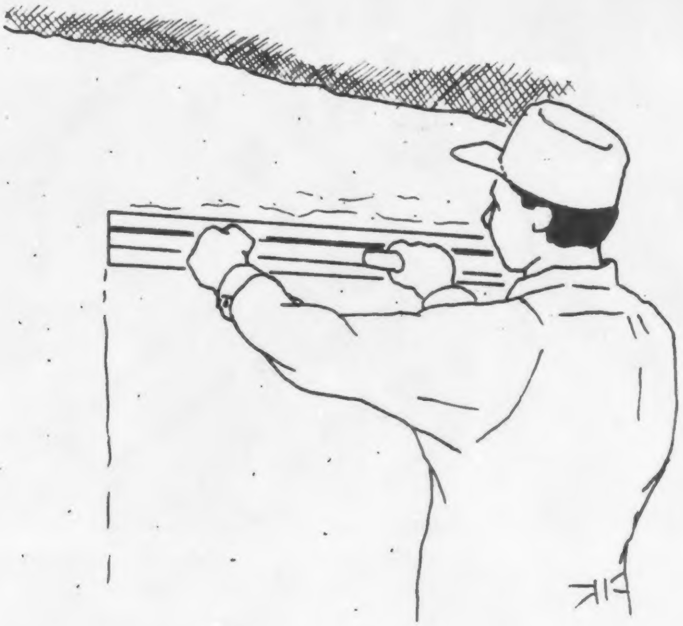
USING THE DARBY

The darby is used to go over areas after they have beeen rodded. The darby works to compact and smooth. It makes a flat, dense surface. Before starting to use the darby, conventional gypsum plaster should be lightly sprayed with water (or use a brush and dash the water on the surface). Stucco surfaces should not have water added.

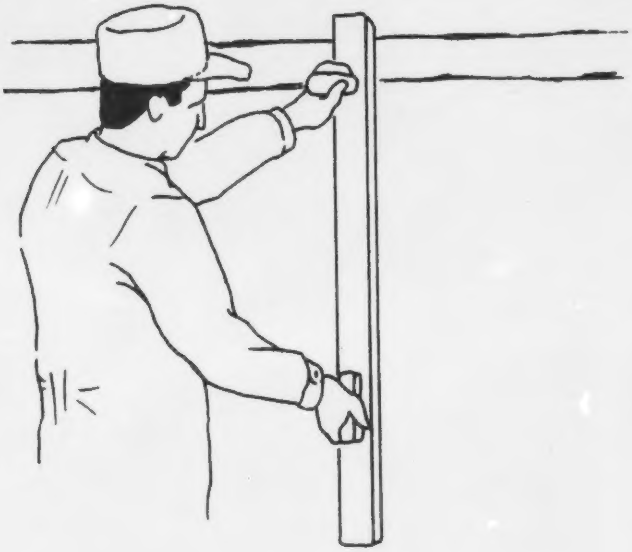
The water makes a thin coat that will let you darby without pulling plaster off the lath. But too much water is bad. Too much water will "kill" the top layer of plaster. Any plaster that is "killed" this way will not get hard. (See the illustrations on the following page.)

Start by holding the darby in the direction opposite that which you held the rod. If you held the rod vertically, you should hold the darby horizontally. Also, slant the darby a bit, as you did the rod. This lets water run off without it getting on your hands or clothing.



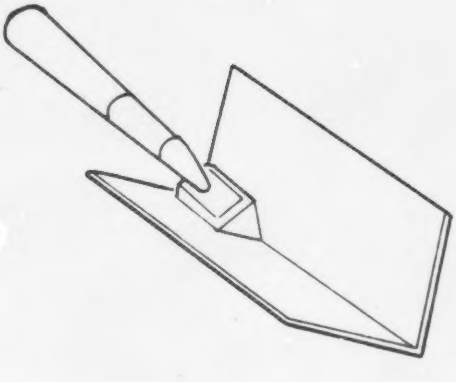


Work from the bottom of the surface to the top. Then hold the darby vertical and move across the surface. Let one end of the darby rest on the screed. This will help keep a hollow area from being made between the screeds.

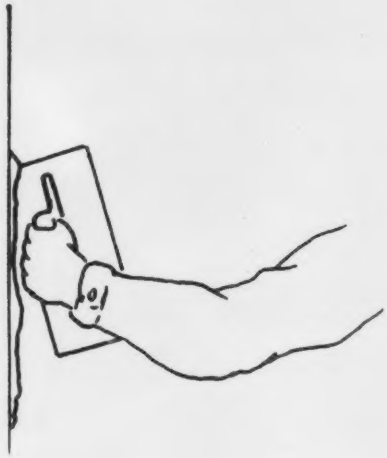


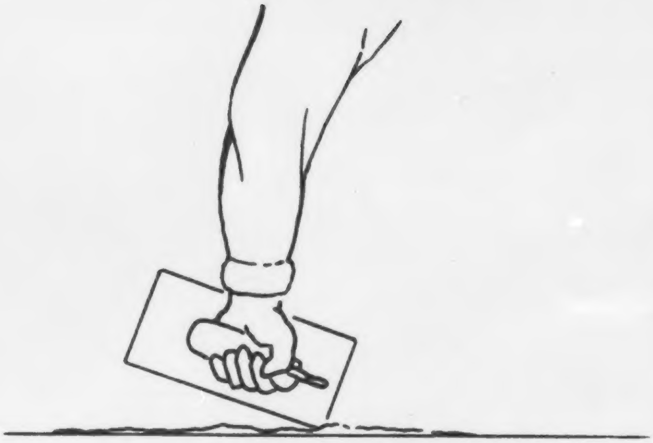
Trimming Angles

Angles should be cut or trimmed when the darbying is done. Start with a clean trowel or angle plow.



Remember to hold the trowel at a slight angle. The heel should be away from the wall to keep it from digging into the surface. Use enough pressure on the toe to make it cut off extra plaster that may be left in the angle after darbying. The toe of the trowel is used to cut vertical angles. Ceiling angles are cut with the heel of the trowel. The base is trimmed with the toe of the trowel. You need to trim the base a bit to allow for the finish coat.





NOTES:

1. On a high suction base, you won't have time to do it all at once. The plaster will set up before you can finish. So plan your work carefully.
2. After everything is done, some plasterers like to go over the angles one more time using a featheredge.
3. MACHINE APPLICATION:

   If the plaster is being applied by machine, a 4-person crew may be used:

   a. Holds the nozzle and applies the plaster.
   b. Uses the rod to level the work.
   c. Fills in low areas.
   d. Uses the darby to make a smooth surface. Also cuts and trims the angles.

INDIVIDUALIZED LEARNING SYSTEMS

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. Water should not be sprayed on before darbying a ______________ surface.

2. ______________ people are used to apply plaster with a machine.

3. When using the rod, hold your hands about ______________ feet apart.

4. When trimming corners, hold the trowel at an ______________.

5. Too much ______________ sprayed on a surface will "kill" the top layer.

6. The rod is used to ______________ ______________ spots and ______________ ______________ ______________ spots.

7. The ______________ of the trowel is used to trim wall angles and the base.

8. If you rodded vertically, you should start darbying ______________.

9. The darby is used after the rod to ______________ and ______________ a surface.

10. When filling in hollow spots, do not ______________ nearby areas.

11. The ______________ of the trowel is used to trim ceiling angles.

12. Before darbying, a conventional gypsum plaster surface should be sprayed with ______________.

13. When darbying, work from the ______________ to the ______________ and then move ______________ the surface.

14. Passes with the rod should overlap each other by about ______________ the length of the rod.

Self Assessment Answers

1. stucco
2. four
3. 3
4. angle
5. water
6. find low, scrape off high
7. toe
8. horizontally
9. compact, smooth
10. "rob"
11. heel
12. water
13. bottom, top, across
14. 1/2

INDIVIDUALIZED LEARNING SYSTEMS

Job Sheet

COMPLETE THE FOLLOWING TASKS.

Materials: Tools and materials needed to put a brown coat of gypsum plaster on a wall and to rod and darby that surface.

1. Apply plaster to a wall surface, then rod and darby to make a professional quality surface.

2. Use the space below to describe what you will do before you do it.

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ When darbying, spray water on a stucco surface to make it more workable.

2. ____ When filling in low spots, take plaster from nearby areas.

3. ____ Angles should be cut or trimmed after darbying.

4. ____ The rod is used to fill in low spots.

5. ____ When applying plaster with a machine, a 2-person crew is usually large enough.

6. ____ Hold the rod and the darby at a slight angle when you are using them.

7. ____ To get a good job, you have to "kill" the top layer of conventional gypsum plaster.

8. ____ Wall angles are trimmed with the toe of the trowel.

9. ____ The order of rodding is: Ceiling, top of walls, bottom of walls.

10. ____ On a high suction base, you should have time to do it all at once.

11. ____ Keep your hands a foot or less apart when holding the rod.

12. ____ Having one end of the darby on a screed will help keep a hollow area from being made.

13. ____ Ceiling angles are trimmed with the toe of the trowel.

14. ____ When plastering, it is better to leave a few low spots than to put on too much plaster.

15. ____ The base should be trimmed to allow for the finish coat.

Instructor Post Assessment Answers

1. F
2. F
3. T
4. F
5. F
6. T
7. F
8. T
9. T
10. F
11. F
12. T
13. F
14. T
15. T

FLOATING

Goal:

The student will be able to identify various floats, explain their uses and demonstrate floating to the trade standard.

Performance Indicators:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Information section. This section will give you the information you need to understand the subject.

4. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

5. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

6. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

Floating is one way in which a professional plastering job can be finished. The "sand finish" uses the floating technique. This is one every plasterer has to know how to make.

Floating is done with a type of tool called a float. There are many different kinds of floats. This module will help you learn about different kinds of floats, what floating is, and how to do it.

Supplementary References

1. Plastering Skill and Practice. F. Van Den Branden. 1971. pp. 285-299.

2. Incentive Apprenticeship Training for Plasterers. "Unit 6: Applying the Finish Coat." National Association of Home Builders. 1979. pp. 5-6, 14.

Information

Most floating work is done on finish coats. Brown coats can also be floated. A finish coat can be:

1. Textured.
2. Troweled smooth.
3. Floated.

Texturing a finish coat means to put a design right into the surface of the plaster. The finish coat is not smooth.

Troweling is done by rubbing the plaster after it has been applied. The tool used to rub and compact the plaster is the trowel. Plaster compacted with a trowel has a hard, smooth and polished finish.

The use of a float also compacts the plaster. But the finish made by floating is not as smooth as a troweled finish. A float finish has a fine grain texture and does not have the polished look of a troweled finish. This is because floating pulls the aggregate to the surface of the plaster material.

Because of the way the floating tool pulls the aggregate to the surface, it is important that the sand be sized correctly. The sand that is used has to be all the same size to make an even-looking texture on the finished surface.

Before a finish coat that will be floated is applied, the brown coat should be evenly dampened. This will lower the suction. If the brown coat is too dry, it will absorb all the moisture from the finish coat. This can make it hard to float the finish coat and can give the final finish a poor texture. But too much water is also bad. So, be careful to use as little water as possible when floating. The finished surface can be discolored by using too much water.

Floating does two jobs for the finish coat of plaster material. Floating straightens the work and it also compacts the plaster at the same time.

To make the fine-grained surface that is common to a float finish, plasterers used to tack strips of carpet material onto a wood float. This worked okay, but the carpet material had to be taken off and replaced all the time. Then sponge rubber was introduced, and it replaced all other materials for making a float finish. Sponge rubber makes a perfect finish float.

The first sponge rubber used was in a round shape. Then flat sheet sponge rubber was introduced. Now several kinds of rubber and some plastics are available. As a plasterer, you will have to decide which works best for you in getting the results you want.

HOW TO FLOAT

Before doing anything, make sure the surface is ready to be floated:

1. Look closely to make sure the watery sheen is gone from the surface of the plaster material.
2. Test float a small area to make sure the float doesn't stick.

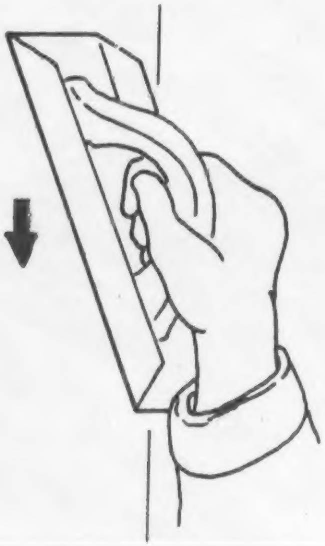
The float is a flat and rigid tool. It is used to cut down any bumps left and also to push excess plaster into any hollows. The use of a float tool also compacts the plaster material, which helps to prevent check cracking.

To begin floating, sweep your arm over the surface with a circular motion. The blade of the float should always be touching the surface that is being floated. The blade should be held flat, or very close to flat, against the surface being floated. To make the final surface texture, repeat the floating. For this final floating, use a softer float than the one used the first time.

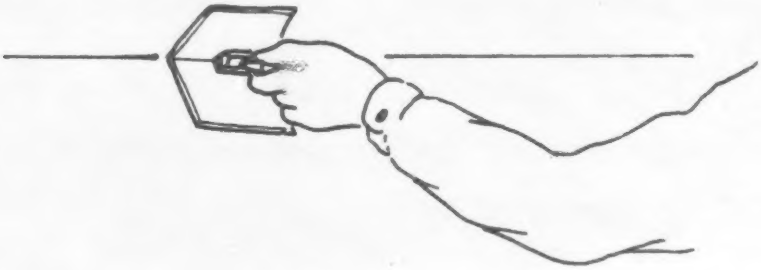
Floating An Angle

After the coat of plaster has been applied, the angles in the room are floated. This step involves filling in and squaring up all of the angles in the room--the places where two wall surfaces meet or where a wall surface meets a ceiling surface. An aluminum or plastic angle float and some of the plaster material are used to work the angle and make it square and straight. You may need to add more plaster as you float the angle.

1. Draw the angle float up and down the sides of the angle
2. The bottom of the float is held a little bit away from the wall. This is to keep the float from digging into the soft plaster.
3. You can also help keep the float from digging into the plaster under it by lifting up one end of the float a little bit.
   a. When you are making an "up" stroke, lift the top end of the float.
   b. When you are making a "down" stroke, lift the bottom end of the float.
4. Repeat these steps until the plaster is smooth and a straight angle is made.



NOTE: An angle float and an angle trowel do the same thing. The advantage of an angle trowel is that you can do both walls at the same time. But mortar has to be added with a separate trowel. The float does not cut into the plaster like the trowel and may make a stronger angle.



Floating Techniques

Sand Finish is one of the oldest plastering finishes. The plaster mixture is much like the base coat of regular lime mortar. One big difference is that the sand finish mix uses a very fine grade of sand. This sand has been screened to get sand pieces that are all the same size. The most often used sand is white or light colored.

To get a sand finish, the finish coat is not troweled. Instead a float is used. The floating is done in two steps and makes an even-looking surface that looks much like sand paper when all steps are completed.

1. The plasterer works by sweeping the arm in a circle. The blade of the float should be kept in contact with the plaster surface all the time.
2. Final floating is done with a rubber-faced float. The rubber-faced float lets the plasterer bring up an even surface. You should not use the rubber float alone to do both the rough and the final floating. The rubber float moves with or conforms to the humps and hollows of the plaster surface. A harder float will help get rid of bumps and hollows.

A lime mortar scratch coat is not used very much. This coat must be compacted with a hard float. Sometimes a nail is driven through the front edge of the float just enough to let the point of the nail stick out and scratch the plaster surface. This helps make a good bonding surface for the finish coat.

Lime mortar operations are the same as those used in gypsum mortar systems: Applying, rodding, darbying, etc. But a final floating is an extra operation. If lime mortar is not floated (and compacted) it will crack because the plaster material can shrink.

A portland cement finish coat may have a texture, a trowel or a float finish. On jobs of ordinary size, one plasterer applies the finish coat and a follow-up plasterer floats or textures the surfaces. When the area is large, more plasterers are needed. Two types of floats are used to make the popular float finish:

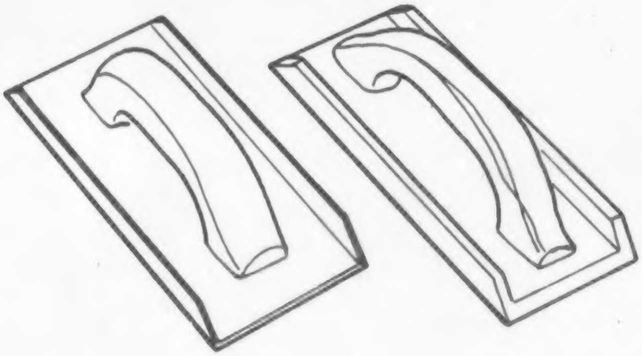
1. A hard float is used to compact and straighten the work.
2. A rubber-faced float is used to make a fine-grained and even texture.

The steps in making a trowel finish are:

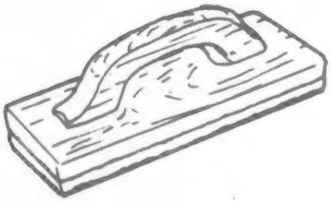
1. First float the surface.
2. Then trowel to a smooth, dense body.

Acoustic plaster can be floated with a cork or rubber-faced float. The floating has to follow the application of the plaster as soon as possible. This is the best way to make the texture come out right. One person applies the plaster and a second follows right behind to float the surface. On larger areas, enough plasterers will have to be used so that the whole thing can be finished without having to stop.

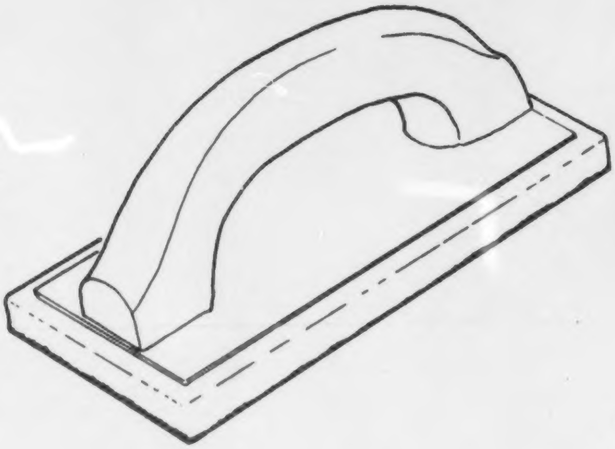
COMMON FLOAT TOOLS



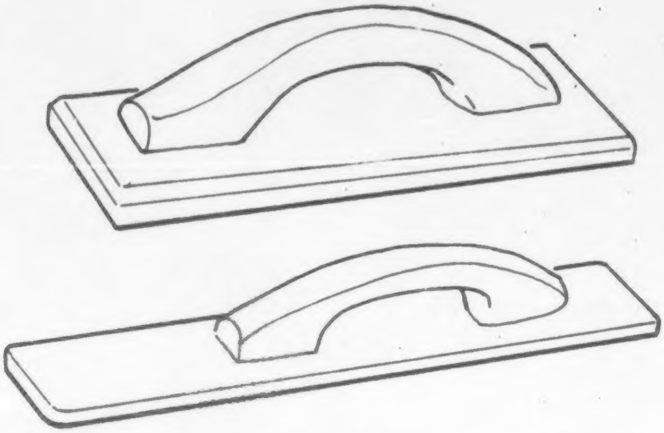
The angle float is used to apply plaster to inside angles. It is also used to trim and straighten angles. The flanged sides are there to keep the float from cutting into the opposite wall when the plasterer is working in the corner. It may be made of aluminum, stainless steel or plexiglass.



The cork-faced float is used mainly for finishing acoustic plaster and cement.



The general purpose float may have a surface of molded rubber, sponge rubber, foam plastic, sheet vinyl or poly-foam bonded to a wood or plastic back. A handle is mounted on this hard-backing piece. Some types may have the surfacing material bonded to a softer backing piece (such as a metal reinforced flexible rubber back). This last type is used mainly for sand finish work. Some floats produce a textured surface (such as sand finish). Sponge rubber floats are often used to make a smooth surface.



The wood float is a specialty tool. It can be used to float or smooth out the base coat in stucco work.

INDIVIDUALIZED LEARNING SYSTEMS

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. The float will push down ______________ and ______________ excess material into ______________.

2. The ______________ of the float is held a little bit away from the ______________.

3. Plasterers used to tack strips of ______________ onto a wood float.

4. The floating tool pulls the ______________ to the surface

5. The use of a ______________ or a ______________ will compact the plaster.

6. For the final floating, use a ______________ float than was used before.

7. An angle ______________ and an ______________ trowel do the same thing.

8. Sand used when making a float finish should all be the same ______________.

9. Acoustic plaster can be floated with a ______________ or ______________ float.

10. Floating angles involves ______________ in and ______________.

11. When the ______________ sheen is gone from the plaster ______________, it is ready to float.

12. The finish made by ______________ is not as smooth as the troweled finish.

13. To begin floating, sweep your arm over the ______________ with a ______________ motion.

14. The ______________ does not cut into the plaster like the ______________.

15. Several kinds of ______________ and some ______________ are available to cover floats today.

Self Assessment Answers

1. bumps, push, hollows
2. bottom, wall
3. carpet
4. aggregate
5. float, trowel
6. softer
7. float, angle
8. size
9. cork, rubber
10. filling, squaring
11. watery, surface
12. floating
13. surface, circular
14. float, trowel
15. rubber, plastics

Job Sheet

COMPLETE THE FOLLOWING TASKS.

Materials: Plaster and plastering tools, 3 sheets of gypsum lath.

1. Apply plaster to the sheets of gypsum lath, using a different method to finish each sheet:
   a. Texturing.
   b. Troweling.
   c. Floating.
2. Compare and discuss the 3 different finishes and the techniques used to get them.

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ The float compacts the material, which helps to prevent check cracking.
2. ____ You should not use a rubber float alone to do both rough and final floating.
3. ____ The float finish is smoother than a trowel finish.
4. ____ When floating acoustic plaster, the person floating should follow right behind the person applying the plaster.
5. ____ Before a finish coat that will be floated is applied, the brown coat should be dried.
6. ____ Texturing a finish coat means to put a design right into the surface of the plaster.
7. ____ An angle float is used for interior walls and an angle trowel is used for exterior walls.
8. ____ Most floating work is done on scratch coats.
9. ____ The finished surface can be discolored by using too much water.
10. ____ Floating pushes the aggregate down from the surface of the plaster material.

11. ____ The sand most often used for sand finish is white or light colored and screened to get all pieces the same size.

12. ____ The blade of the float should be held at a sharp angle to the surface being floated.

Instructor Post Assessment Answers

1. T
2. T
3. F
4. T
5. F
6. T
7. F
8. F
9. T
10. F
11. T
12. F

USING STILTS

Goal:

The student will practice the application of plaster using a hawk and trowel while on stilts.

Performance Indicators:

The student will successfully complete a Self Assessment. a Job Sheet and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you compelte it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Vocabulary section. Vocabulary words are important for a good understanding of the trade. After you have studied the vocabulary, ask your teacher to quiz you on the words and their meanings.

4. ____ Study the Information section. This section will give you the information you need to understand the subject.

5. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

6. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

7. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

How do you plaster the top half of an 8-foot wall? You could use a ladder or put up a scaffold. Both of these ways of doing it can take a lot of extra time.

You can also wear stilts. The only extra time needed to use stilts is the time it takes to put on the stilts. So, stilts are good because they save time. But stilts can also be dangerous. It can be easy to slip or trip when you are wearing them if you are not careful.

This module will help you learn about different kinds of stilts. In the Job Sheet part you will also have a chance to practice the safe use of stilts.

Vocabulary

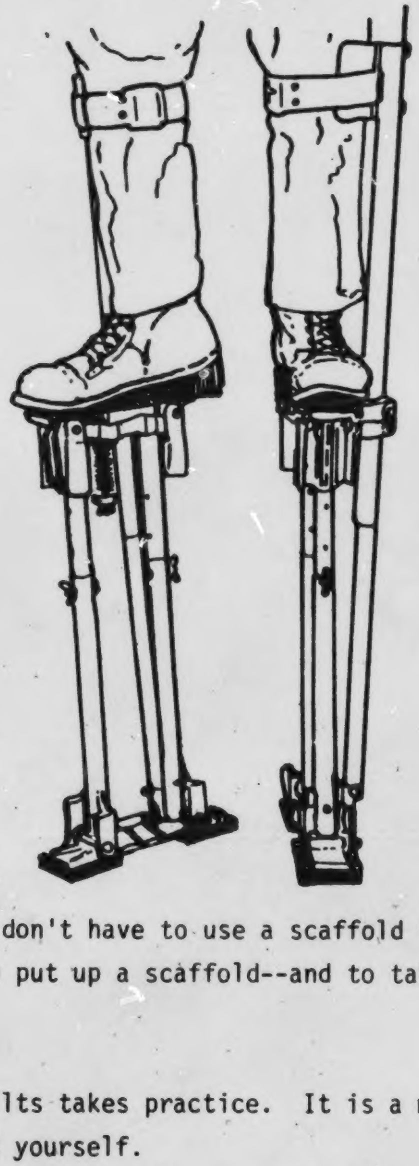
Trade terms are very important for a good understanding of the trade. Study these words and meanings. When you have learned them, ask your teacher to quiz you on the words and their meanings.

SCAFFOLD--A platform to stand or walk on that is made with a frame and planks.

Supplementary References

"Unit 3: Hawk and Trowel, Stilts." *Incentive Apprenticeship Training for Plasterers*. National Association of Homebuilders, 1979. pp. 1-8.

Information



Using stilts means you don't have to use a scaffold to reach high places. This gets rid of the need to put up a scaffold--and to take it down again. This saves time.

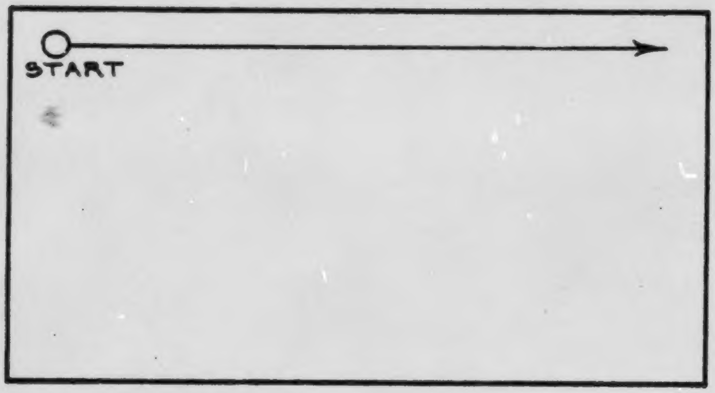
To learn how to use stilts takes practice. It is a matter of watching someone else, and then doing it yourself.

1. Watch someone who knows how to use stilts.
2. With your instructor's help, put on stilts yourself.
3. Learn how to move around while you are wearing the stilts.

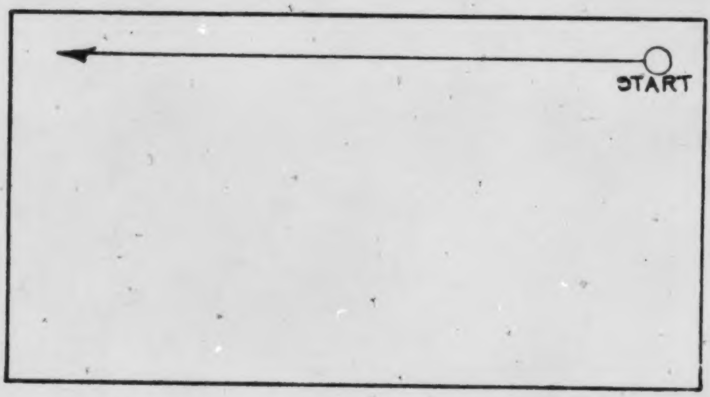
4. Apply plaster while you are wearing stilts.
5. Lots of practice.

Working with Stilts.

Stilt work is a job for a team of 2 or more persons. Some will wear stilts and others will not. The ones who wear the stilts will work on all of the high places. The ones who do not wear stilts will work on all of the low places. The following diagram shows how two plasterers will work on a wall. The worker on stilts starts a wall, the other worker follows behind and below. It is done this way so plaster doesn't set up and become hard to work, and so the plasterer on stilts doesn't drop plaster onto the plastered wall below.



The diagram shows the method for applying a base coat. The finish coat would be started in the opposite corners.



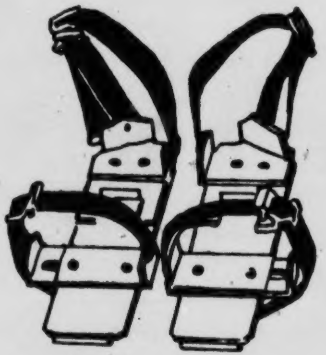
Information about Different Kinds of Stilts.

There are several different kinds of stilts. Some of them are shown in the illustrations following this section. In general, there are two kinds of stilt frames and two kinds of stilt bases.

Stilt frames can be either adjustable or non-adjustable. The height can be changed on adjustable stilts. Depending on the pair of stilts, they may be adjusted as low as 6" or as high as 36". The height on non-adjustable stilts cannot be changed. Whatever height the pair of stilts is, is the only height that pair of stilts can be. A pair of 24" non-adjustable stilts cannot be changed to any other height. The non-adjustable kind of stilts usually costs less than the adjustable kind.

Stilt bases can be flexible or solid. A flexible base bends when you bend your leg. The solid base style does not bend.

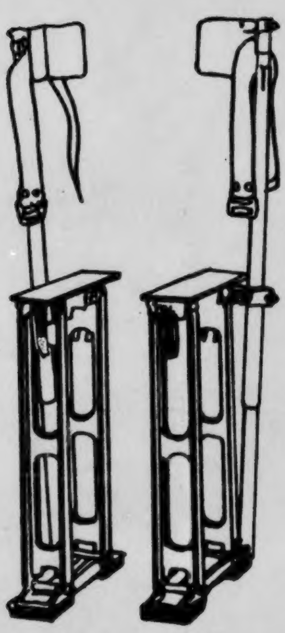
With some stilts, you have to put bolts in a pair of shoes. Then the shoes are bolted to the shoe plate of the stilts. (The shoe plate is the part of the stilt on which you put your foot.) There is an adaptor for this stilt type. It is called the "strap-on adaptor." If it is used, shoes do not have to be bolted to the stilts.



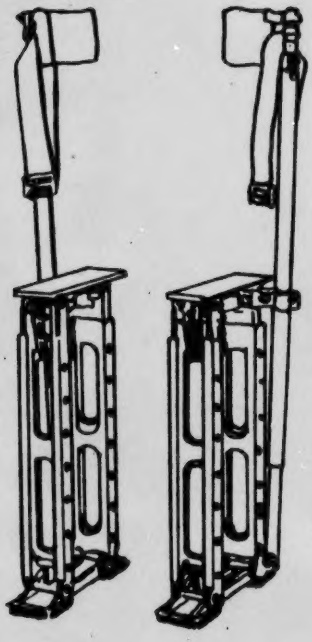
Most stilts are made with an aluminum frame. This keeps them light in weight so that you don't wear yourself out just lifting up your feet. Most aluminum stilts are made to hold no more than 225 pounds maximum weight.

(See the following page for illustrations.)

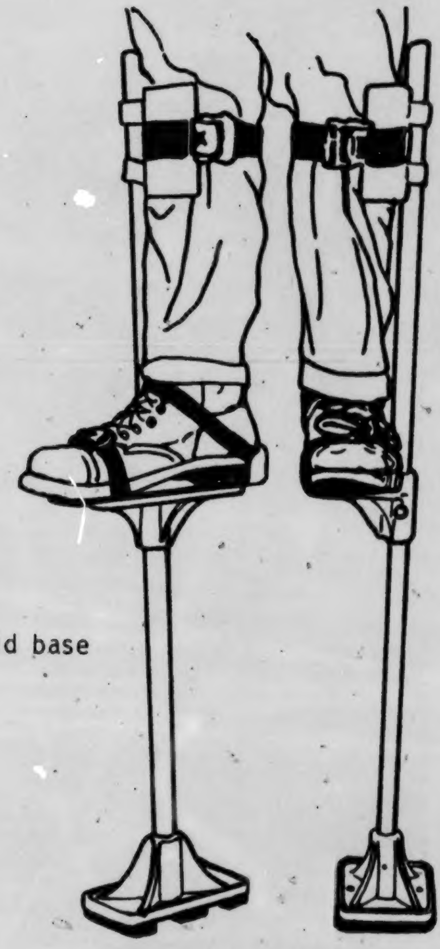
*Warning: Stilts are not to be changed to a longer length than the manufacturer recommends.



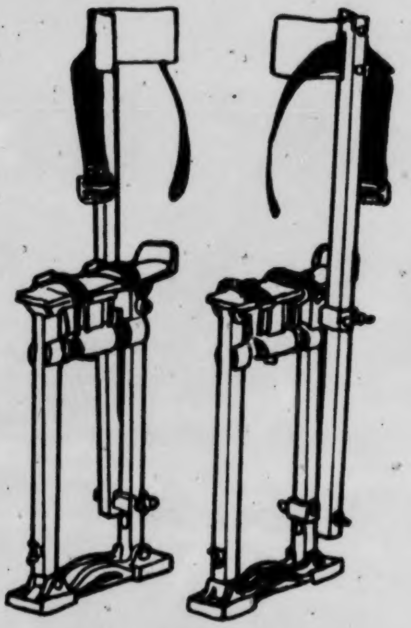
non-adjustable



adjustable



solid base



flexible base

Learning to Use Stilts.

WARNING: Don't break a leg. The surface you walk on when you are wearing stilts must be clean. All pieces of wood, plaster, piles of sand and so on must be swept up before you put on the stilts. If you slip while you are wearing a pair of stilts, you will fall. If you fall, it is very easy to break a leg.

1. Adjust the stilts to the lowest height.
2. Practice walking around.
3. When you are comfortable walking around:
   a. Go through the motions you would use to plaster a wall.
   b. Go through the motions you would use to plaster a ceiling.
4. When you are comfortable doing the above, change the height of your stilts to a working height.
   a. Practice walking around.
   b. Go through the motions you would use to plaster a wall.
   c. Go through the motions you would use to plaster a ceiling.

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. Most stilts are made with an ______________ frame.

2. Each plasterer ______________ on the ______________ end of the wall.

3. Stilts may be adjusted as low as ______________ inches or as high as ______________ inches.

4. There are ______________ kinds of stilt frames and ______________ kinds of stilt bases.

5. The surface you walk on when you are wearing stilts must be ______________.

6. Learning to use stilts means ______________ someone else and then ______________ it yourself.

7. With some stilts, shoes are ______________ to the shoe ______________.

8. The base and finish coats are started in ______________ corners.

9. The maximum ______________ of most stilts is ______________ pounds.

10. Using ______________ means you don't have to use a ______________.

11. The ______________ on non-adjustable stilts cannot be changed.

12. Stilt ______________ can be flexible or solid.

13. Stilt work is a job for a ______________ of ______________ or more persons.

14. Learning how to use stilts takes ______________.

15. Stilt frames can be either ______________ or ______________.

Self Assessment Answers

1. aluminum
2. starts, same
3. 6, 36
4. 2, 2
5. clean
6. watching, doing
7. bolted, plates
8. opposite
9. weight, 225
10. stilts, scaffold or ladder (either word acceptable)
11. height
12. bases
13. team, 2
14. practice
15. adjustable, non-adjustable

Job Sheet

COMPLETE THE FOLLOWING TASK.

1. Mix plaster or practice plaster.*
2. While wearing stilts, apply to ceiling and/or wall surfaces as directed by your instructor.
3. Before you start: Use the space below to describe what you will do.

*Practice Plaster

3 parts sand
1 part lime
Enough water to make a workable mix.

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ Before putting on the stilts, the floor should be swept.
2. ____ Adjustable stilts are ones that can be adjusted for different shoe sizes.
3. ____ Non-adjustable stilts often cost more than adjustable stilts.
4. ____ All of the plastering should be started on the same end of a wall.
5. ____ Most stilts are made to hold no more than 225 pounds.
6. ____ There is only a small chance of getting hurt if you fall while wearing stilts.
7. ____ Aluminum is used in stilts to make them stronger.
8. ____ Stilts make work easier, but the job takes longer.
9. ____ The finish coat is applied the same way as the base coat.
10. ____ There are two basic kinds of stilt frames.
11. ____ Stilt work is a job for a team of plasterers.
12. ____ With some stilts the plasterer's shoes are bolted right to the stilt shoe plates.

13. ____ Stilts may be as low as 6 inches or as high as 36 inches.

14. ____ The first step of learning to use stilts is to watch someone else.

15. ____ A stilt base can be either flexible or solid.

16. ____ The strap-on adaptor will not work for bolt-on type stilts.

Instructor Post Assessment Answers

1. T
2. F
3. F
4. F
5. T
6. F
7. F
8. F
9. F
10. T
11. T
12. T
13. T
14. T
15. T
16. F

SPRAYING EQUIPMENT

Goal:

The student will be able to explain the correct use of various guns and sprayers in the application of plaster and will demonstrate their use.

Performance Indicators:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Information section. This section will give you the information you need to understand the subject.

4. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

5. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

6. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

Plaster can be applied by machine much faster than it can be applied by hand. If you know how to use plastering machinery, you will be able to do more kinds of plastering work. This module will help you learn about plastering machinery and how to operate this machinery.

Supplementary References

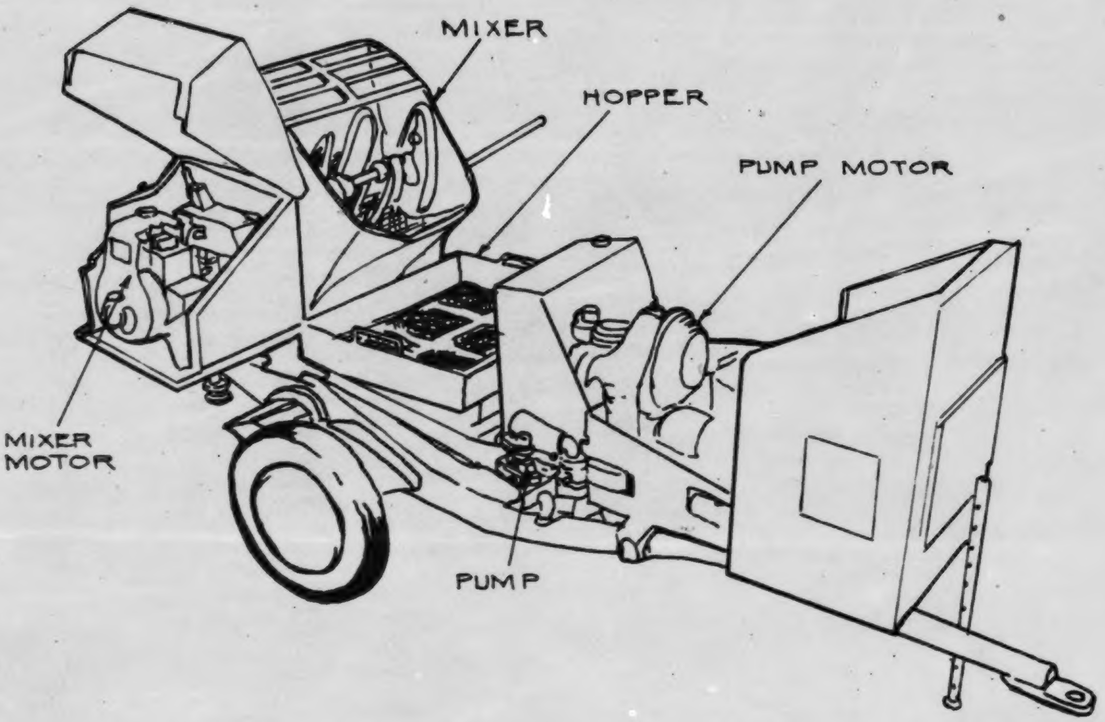
1. Plastering Skill and Practice. F. Van Den Branden. 1971. pp. 311-13.
2. Gypsum Construction Handbook. United States Gypsum Company. 1978. pp. 395-401.

Information

MACHINE PRIMING

Gypsum Base Coat Plaster:

Put 10 gallons of water in the hopper of the spraying machine.



Spraying machine with mixing machine attached.

Disconnect nozzle from the hose. Leave the control line connected. Pump water from the hopper to wet the inside of the hose.

Pour plaster into the hopper. Do not have more than 1 inch of plaster on top of the screen. Start the pump and check the speed. Let the pump push the water through the hose. When plaster begins to come through, turn off the pump. Connect the nozzle back on the hose, and the machine is ready to use.

Stucco Plaster

Wet the inside of the hopper, then drain the extra water. Pump water through the hose and then drain it. Pour stucco through the screen into the hopper. Start the pump. When plaster starts coming through the hose, turn off the machine. Connect the nozzle back onto the hose, and the machine is ready to use.

NOTE: The first plaster coming out of the nozzle should be a bit wetter than normal. The rest should be a little wetter than you would use for handwork.

CLEANING THE MACHINE

Pump all the plaster out of the machine, adding water as needed so you don't have to turn it off until all the plaster is out. Then take off the hose at the pump outlet. Put a sponge into the end of the hose. Put the hose back on the outlet. Fill the hopper with clean water and pump the sponge through the hose.

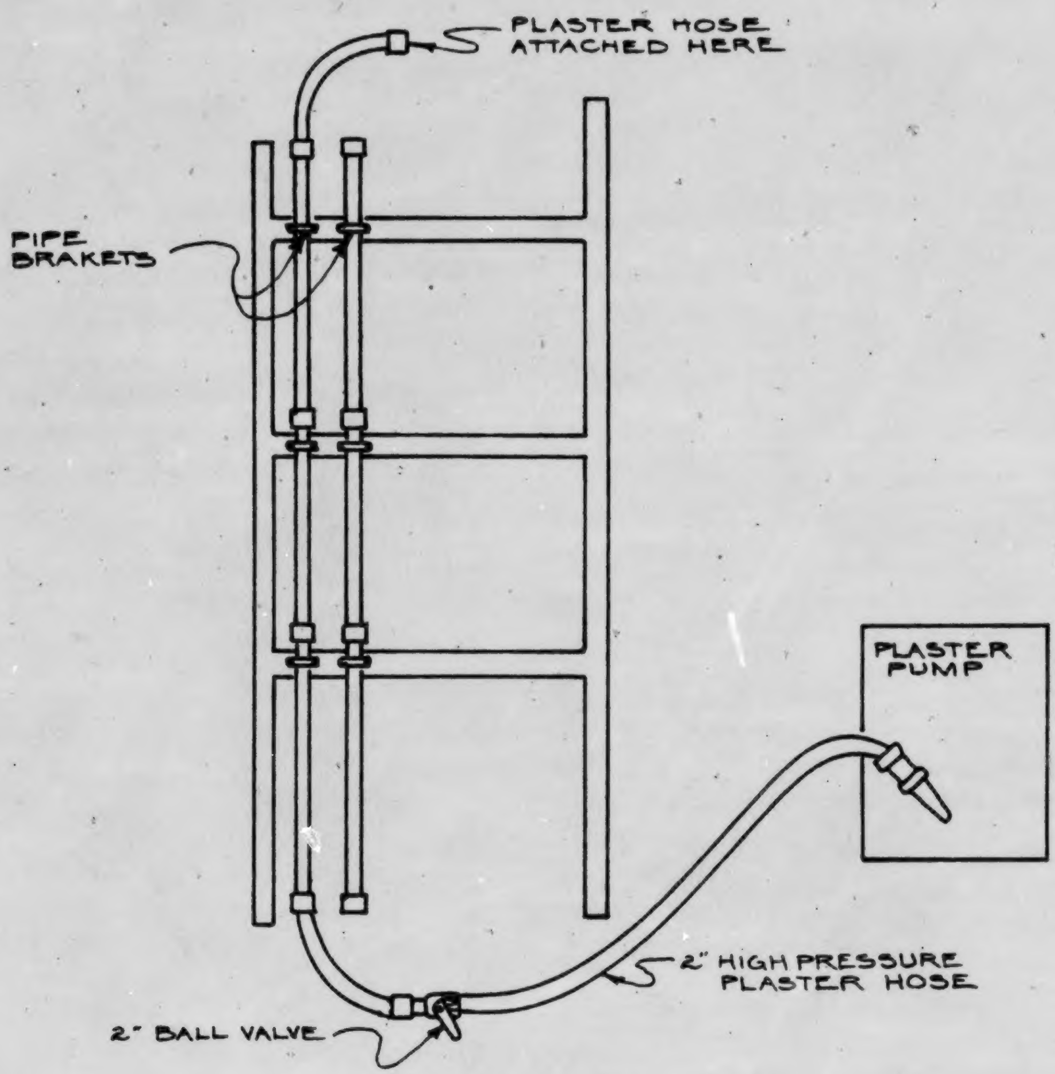
HIGH-RISE PLASTERING

Pipe should be used instead of hose where this is possible. The plaster will go through the pipe better than it goes through a hose over longer distances. When pipe and hose are used together, make sure they are both the same size. (See the illustration on the following page.)

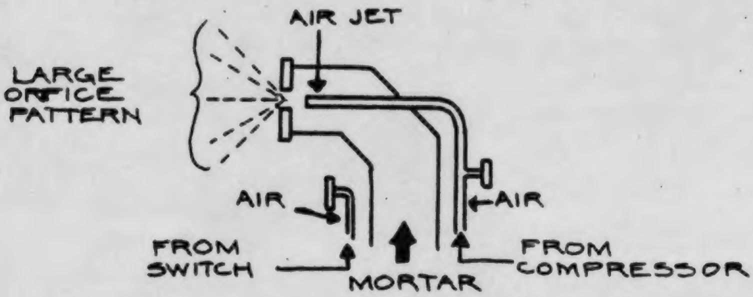
USING THE NOZZLE

The controls for starting and stopping the machine are on the nozzle. These controls can be air powered or electric. The same nozzle can be used for scratch, brown or finish coats. By adjusting the air stem and using the proper orifice, you can get different textures. The nozzle is usually held 18 to 24 inches from the lath. (See the second illustration on the following page.)

When the nozzle makes a high sound similar to a scream, this is called "high frequency." At high frequency, you get small pieces of plaster. At low frequency, you get larger pieces. The higher frequency (small pieces) will make a fine texture pattern. The lower frequency (larger pieces) makes a heavy pattern, such as would be used for browning.


PLASTER HOSE ATTACHED HERE
PIPE BRAKETS
PLASTER PUMP
2" HIGH PRESSURE PLASTER HOSE
2" BALL VALVE

Set-up for high-rise plastering.


AIR JET
LARGE ORFICE PATTERN
AIR
AIR
FROM SWITCH
MORTAR
FROM COMPRESSOR

Orifice openings for conventional gypsum plaster base coats are usually 1/2 inch or larger.

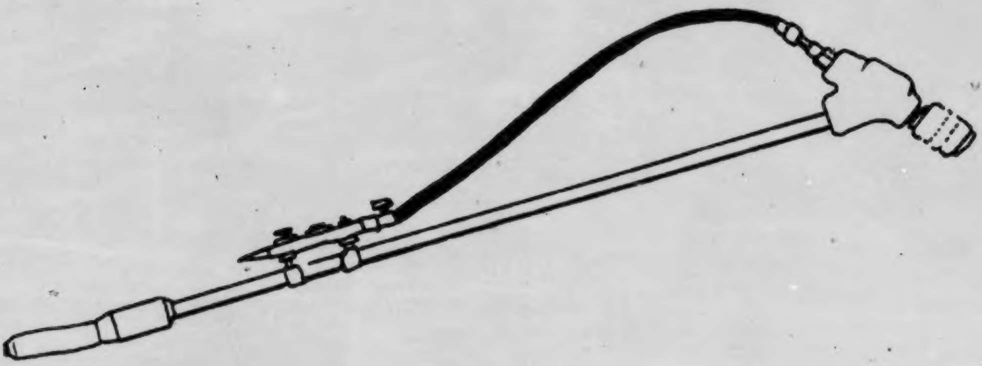
To Make a Higher Frequency

1. Raise the air pressure.
2. Use a smaller orifice.
3. Move the air stem forward.

To Make a Lower Frequency

1. Lower the air pressure.
2. Use a larger orifice.
3. Move the air stem back.

If the air pressure is too high, the plaster will bounce off the lath. If it is too low, you will get a narrow spray pattern and an uneven coat of plaster.



Pole gun.

Pole guns are long so the plasterer can reach higher places without using stilts or scaffolding. They can have either an air-powered or an electric start-stop control.

PLASTERING MACHINE HOSE

A plastering machine has a 3/8 inch air supply line, a 3/8 inch air control line and a hose for pumping the plaster. The normal plaster hose is 2 inches in diameter for the first 50 feet. After that it has a diameter of 1 1/2 inches. The air supply line brings air to the nozzle. This air is used to make the pattern and spread the plaster. The control line brings air to operate the control valve. When the valve is opened, the air pressure is released. This stops the machine.

Hose Safety

1. Keep hoses and connections in good condition.
2. Move hoses carefully to keep them from getting kinks.
3. Take the safety valve apart every day and clean it.

APPLYING SCRATCH COAT PLASTER

To scratch metal lath at normal pumping speed, use a 5/8 inch orifice. Set the air stem 1/2 to 5/8 inch behind the orifice. If you are spraying onto paper-backed lath, the scratch coat should be about 1/2 the total thickness.

Hold the nozzle at an angle to the metal lath. This will keep the plaster from going straight through. If you look closely at diamond mesh lath, there is a flat side to the wire. Spray so that the plaster hits this flat area and will stick there. Metal lath should always be hung so that the plasterer can stand and easily point the gun at this flat area. The air pressure should be set to make a 6 to 8 inch diameter spray when the nozzle is 12 inches from the lath.

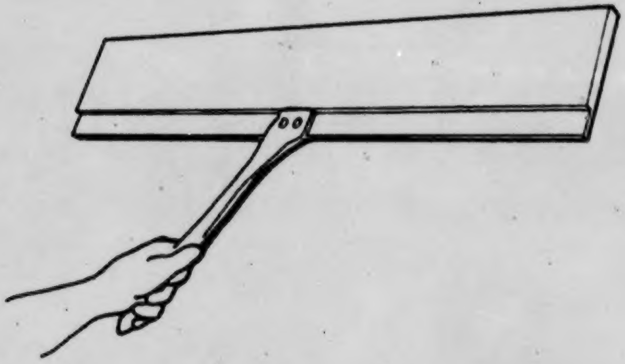
In some cases, the lath may have to be "fogged in," or covered with a fine mist of plaster. When this misted layer has partially set, apply the full scratch coat. Lath that is backed with paper does not need to be fogged in.

APPLYING BROWN COAT PLASTER

A 1/2 inch orifice is used for much brown coat work. Set the air stem about 3/8 inch behind the orifice. You will need to make a pattern with a 12 inch diameter when the nozzle is 12 to 15 inches from the surface.

Move the nozzle with steady, even strokes, each about 4 feet wide. Start at the top and work down the lath. You don't have to move fast, instead try to get the right thickness laid with one pass of the nozzle.

(See the illustration on the following page.)



A spray shield can be used to protect areas from accidental spraying with plaster.

Be careful not to spray other areas. You can move the nozzle closer to the lath and hold it at an angle when you are spraying near windows, doors and grounds.

On high suction bases (such as masonry) almost any thickness of plaster can be made. A 3" thickness on masonry is possible because of the way the plaster is compacted by the force of the spray. Often, though, it is better to apply a thin coat and then follow right after with a second coat to build the needed thickness.

APPLYING ACOUSTICAL PLASTER

There are 2 types of acoustical plaster. One type should not be machine sprayed. This type uses an air-entraining admixture to make the sound-absorbing air pockets in the plaster. When this type is sprayed, it looses some of the air in it, so it no longer absorbs sound as well.

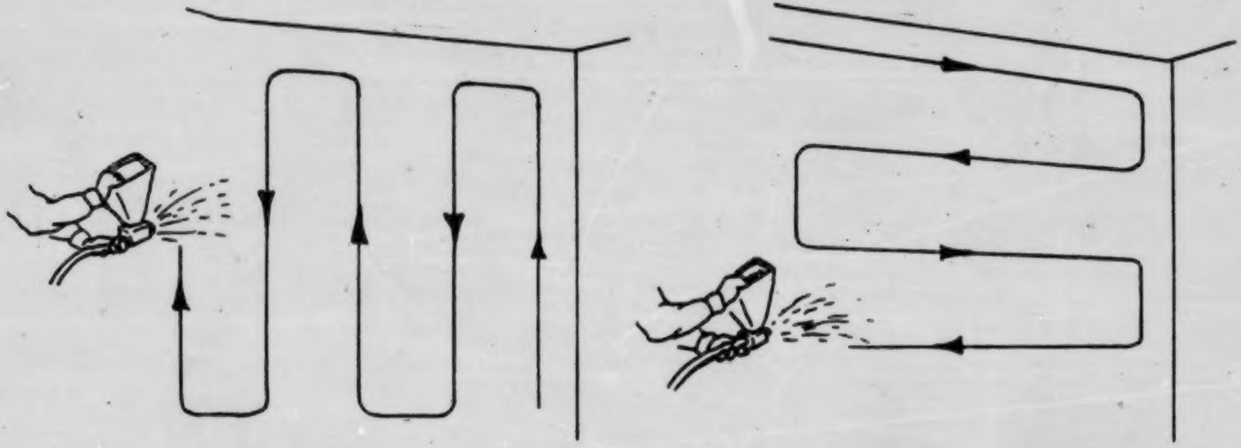
The type that uses a colloidal clay can be used with spray equipment. This type makes the air pockets that trap sound when water evaporates. The evaporated water leaves air spaces behind.

Normal Suction Bases

Apply a 1/2 inch coat. Rod and darby using metal tools. A metal rod and darby have less chance of pulling the plaster off the base. When firm you can apply a finishing texture.

Low Suction Bases

Apply a scratch coat 1/4 to 3/8 inch thick. Let it dry before applying the next coat. Apply the second coat 1/4 inch thick, rod and darby. Hollows and ridges have to be smoothly covered or they will show through the finish coat. When firm, a finishing texture may be applied.



PATTERN No. 2

PATTERN No. 1

Machine texturing with a cross pattern.

COMMON PROBLEMS

Pumping Machine Loses Pressure

Material flow is controlled by poppet or ball valves made of steel, rubber or plastic. If you have a pumping problem, such as loss of pressure, check the valves and pistons for wear before you change the plaster mix.

Mix Begins to get Stiff

Vermiculite and perlite aggregates tend to stiffen a mix that is being pumped. They will absorb extra water when pressure is put on them. Add some extra water if these mixes begin to stiffen. Sand aggregate does not stiffen this way. Do not add extra water when sand aggregate is being used. It can make the sand separate from the plaster. This can cause hose packing or plugging.

Plaster Bounces Off the Lath

Lower the air pressure. You may have to use a larger orifice to keep the same spray pattern.

Brown Coat Plaster Comes Out in a Narrow Stream and the Pattern is Uneven

Raise the air pressure. You may also have to use the next smaller size orifice.

Too Much Plaster Going Through Metal Lath

One of the following may be the cause:

1. Air pressure too high.
2. Air stem too close to orifice.
3. You are not spraying against the flat side of the metal lath wires.
4. Lath is not hung all in the same direction.
5. Nozzle is pointed at the wrong angle.
6. Lath openings are too big.

Hose Pressure is too High

Usually the mix is too stiff. Other things could be:

1. Hose is too long.
2. Hose diameter is too small.
3. Hose fittings clogged with set plaster.
4. Aggregate or gypsum being used needs too much pressure.

Nozzle Clogged with Lumps

If whole batch has lumps, wash out hose and nozzle. Make a new batch.

Nozzle Not Getting Enough Air

One of the following may be the cause:

1. Set plaster blocking air stem in nozzle. Clean the air stem.
2. Air hose blocked with rubber at fitting. Remove blocked part. Cut about 1 inch of hose off.
3. Air hose blocked with plaster. Wash out the hose.
4. Air hose fittings leak. Repair leak.
5. Pressure blowoff valve set too low. If air is bleeding off at the tank: (1) Loosen jam nut on the pressure blowoff valve. (2) Turn plunger in until all of the air goes out the line. NOTE: Blowoff valve should not be set for more than 60-70 psi.
6. Filter is plugged; air can't get into air compressor. Replace felt or wash in gasoline.
7. Not enough air pressure or volume. Wash valve assembly in solvent to remove any dirt or carbon.

Nozzle Spray Too Narrow

One of the following may be the cause:

1. Air pressure too low.
2. Orifice too large for the plaster volume.
3. Air stem set too far back from the orifice.

Aggregate is Separating

Water and cement can separate from the aggregate when the machine is shut off. This leaves the aggregate in the nozzle. When the machine is started again, the aggregate won't go through the nozzle tip. Remove and wash the tip. If pumping stucco, an air entrainer can be used to stop the water separation. Be sure to use washers in hose connections when the mix has portland cement in it.

Quick Setting Gypsum in the Machine

A bag of gypsum sometimes may set up almost at once. If this happens, take it out of the machine as soon as you can. Add water to the mix. Remove one section of the hose. Try to pump out the mix. If the motor stalls, take off all of the hose and pump the mix out of the machine.

Engine Won't Turn the Pump

One of the following may be the cause:

1. Material is too stiff, making clutch and belt slip.
2. Engine speed is set too slow. Not enough power going to the automatic clutch.
3. Need to adjust drive belt. You can push down on the drive belt about 1/2 inch when it is properly adjusted.
4. Belt is badly worn and slipping.
5. Material has separated in the hopper. This can make the pump jam.

Nozzle Slide Valve Control Not Working

One of the following may be the cause:

1. Loose air hose connections.
2. Air control piston is sticking. If the piston does not look polished, remove and polish with a very fine crocus cloth. Make sure the small hole in the piston face is clear.
3. Air compressor not giving enough air to work the air control piston.

Volume Production of the Pump Gets Less

One of the following may be the cause:

1. The rubber check balls have worn too small. Replace them.
2. Piston assembly on pumping side is damaged or worn. It is pulling in air from the outside instead of pulling material from the hopper.
3. Shoulder has worn off the valve seats. Replace.
4. Material is too stiff for pumping.
5. Pump gaskets are leaking.

Engine Turns Pump, but Material is Not Coming Out

Air can be trapped in the pump housing. The pump can lose its prime. To avoid, dump material into the hopper just when the water level reaches the top of the outlet hole in the hopper.

Pump is Air Locked

Start machine with either water or plaster in the hopper. Take off the hose and put your hand over the pump outlet. This will make plaster or water be pulled into the pump. That will force the air out, and the machine will then work normally.

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. The controls for the machine are on the ______________.

2. For a scratch coat, set the gun to make ______________ to ______________ inch spray at a 12 inch distance.

3. The control line brings ______________ to operate the control valve.

4. To prime a machine for gypsum plaster:
   Put 10 gallons of ______________ in the hopper.
   Disconnect the ______________ from the hose.
   Pump ______________ from the hopper to ______________ the ______________.
   Pour plaster into the ______________.

5. When cleaning the machine, you put a ______________ in the hose and pump water to push it through.

6. Air entrained acoustical plaster should ___________ be ______________.

7. At low frequency, you get ______________ pieces of plaster.

8. Plaster will go through ______________ better than ______________.

9. Diamond mesh lath has a ______________ side to the wire.

10. The first stucco plaster coming out of the nozzle should be a bit ______________ than normal.

11. The air supply hose and the air control line are _______________ inches in diameter.

12. At high frequency, you get ________________ pieces of plaster.

Self Assessment Answers

1. nozzle
2. 6, 8
3. air
4. water, nozzle, water, wet, hose, hopper
5. sponge
6. not, sprayed
7. larger
8. pipe, hose
9. flat
10. wetter
11. 3/8
12. small

Job Sheet

COMPLETE THE FOLLOWING TASKS.

Materials: Mixing and spraying equipment, diamond mesh metal lath and tools/equipment necessary to install the metal lath, gypsum plaster, sand, perlite or vermiculite.

1. Install 2 separate sections of metal lath, each at least 5 feet long.
2. To the first section: Mix and apply by machine a scratch coat and a brown coat using sand aggregate.
3. To the second section: Mix and apply by machine a scratch coat and a brown coat using lightweight aggregate.

INDIVIDUALIZED LEARNING SYSTEMS

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ All pole guns have an electric start-stop control.

2. ____ To make a lower frequency, lower the air pressure.

3. ____ Water and cement can separate from the aggregate when the machine is shut off.

4. ____ By adjusting the air stem and using the proper orifice openings, you can get different textures.

5. ____ Acoustical plaster using colloidal clay can be machine sprayed.

6. ____ If the air pressure is too low, you will get a spray pattern that is too wide.

7. ____ Hoses should be moved quickly to keep them from getting kinks.

8. ____ Priming the machine means to start the plaster flowing through the hose.

9. ____ A perlite mix may get extra stiff when it is put under the pressure of being pumped.

10. ____ At high frequency, you get larger pieces of plaster.

11. ____ Pole guns are long to make them easier to use when you are working on stilts or scaffolding.

12. ____ Over normal suction bases, acoustical plaster should be applied in 2 coats.

13. ____ The normal plaster hose is 2 inches in diameter for the first 50 feet.

14. ____ Orifice openings for conventional gypsum base coat plasters are usually 1/4 inch or less.

15. ____ Paper-backed metal lath has to be fogged in.

Instructor Post Assessment Answers

1. F
2. T
3. T
4. T
5. T
6. F
7. F
8. T
9. T
10. F
11. F
12. F
13. T
14. F
15. F

ORNAMENTAL PLASTERING WORK

Goal:

Thet student will be able to identify and explain common ornamental plastering materials and techniques.

Performance Indicators:

The student will successfully complete a Self Assessment, an Assignment and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Information section. This section will give you the information you need to understand the subject.

4. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

5. ____ Do the Assignment page. Follow the instructions at the top of the Assignment page.

6. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

Ornamental plastering is done by expert plasterers. But all plasterers need to know the basics of this kind of work. As a plasterer, you will help expert plasterers doing ornamental plastering. This module will help you learn how to do that job properly.

Supplementary References

1. Gypsum Construction Handbook. United States Gypsum Company. 1978. pp. 297-302.

2. "Unit 10: Special Finishes." Incentive Apprenticeship Training for Plasterers. National Association of Home Builders. 1979. pp. 1-18.

Information

One type of ornamental plastering work is to texture the plaster or to make the plaster look like something else. Some examples of this type of ornamental plastering are shown at the end of this module.

The main type of ornamental plastering is making fancy shapes with plaster. An ornamental shape is one that decorates or puts a fancy touch on something. Fancy wall borders, corner pieces, columns, circular shapes can all be ornamental plaster work.

ORNAMENTAL PLASTER MATERIALS

Special plaster materials are often used for ornamental work. There are two main types: Gypsum cement and molding plaster.

When these plaster materials are mixed with water, they make a plaster that can be cast, molded or shaped. Just after it has been mixed the plaster is very fluid; it flows freely. Then it gets thick. Finally it gets hard and then sets.

The time when the plaster is getting thick is when the plasterer can form it to make an ornamental shape. The length of time when a plaster is getting thick (or "creaming") can vary a lot. The type of plaster used, mixing practices, amount of water, room temperature, etc. all affect how long the creaming stage will last. It is very important to know how long this creaming stage lasts, because this will be all the working time you have to make your ornamental shape.

Gypsum Cement

This plaster material has good strength. It is often used for work that will have thin sections or parts because it is strong. If you are going to be using rubber molds, the high green strength of the plaster material helps when you have to take the plaster out of the mold.

MIXING: 100 parts plaster to 45 to 50 parts water by weight.
(1 gallon water equals 8.3 pounds.)
CREAMING PERIOD: 5 to 30 minutes after mixing.

Molding Plaster

This is a utility or general purpose type of ornamental plaster. It is more porous than the cement type, so it may need an extra coat of paint to seal it. It is used when the higher strength of gypsum cement is not needed.

MIXING: 100 parts plaster to 70 to 75 parts water by weight.
(1 gallon water equals 8.3 pounds.)
CREAMING PERIOD: 7 to 35 minutes after mixing.

MIXING ORNAMENTAL PLASTER

By Machine

All measurements have to be very carefully made. Remember that the speed of machine mixing can make it very easy to overmix a batch.

The plaster should be sifted into the water slowly and evenly. Then let the plaster soak for 2 to 5 minutes. Mixing time is also from 2 to 5 minutes. Be sure to use a clock and keep track of the soaking and mixing times. This is the only way to be sure that all batches will be the same. The best guide you will have for exact times to use is the experience you have with the materials.

You will have to use different size machine mixing blades for different sizes of the batches of plaster:

10 to 50 pound batch--3" diameter, 3 blade, 25° pitch propeller.
Powered by a 1/4 to 1/3 hp with 1,760 rpm direct-drive motor.
50 to 200 pound batch--4" diameter, 3 blade, 25° pitch propeller.
Powered by a 1/2 hp with 1,760 rpm direct-drive motor.

The rotation of the propeller should drive the mix downward.

NOTE: The mixing directions may vary for the products of individual manufacturers.

By Hand

Be sure to make careful and accurate measurements. DO NOT DROP handfuls of the plaster into the water. Sift the plaster evenly into the water. Let the plaster soak for 2 minutes by the clock. Do not disturb it during the soaking time.

Mix completely by stirring from the bottom. This will force the plaster material to the top. DO NOT BEAT, or do anything that will put air in the mix. When mixed properly, air is forced out of the mix. Keep on mixing until a smooth, even plaster is made.

NOTE: The directions may vary for the products of individual manufacturers.

EQUIPMENT USED IN ORNAMENTAL PLASTERING

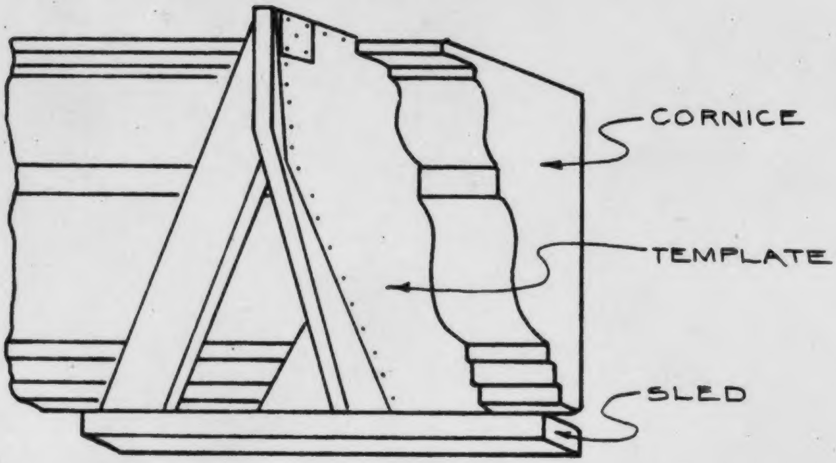
Equipment means the things you will need to make the plaster into an ornamental shape. There are three main types of equipment. TEMPLATES AND SLEDS are often made on the job for the specific work to be done. FORM MOLDS for casting are often made before.

Templates

Metal sheets are used to make the templates that form the plaster into an ornamental shape. Brass and aluminum metals are commonly used. Steel is not a very commonly used metal. It rusts quickly and can stain the plaster when the template is pushed over plaster to scrape out (screed) a shape. (See the illustration on the top of the following page.)

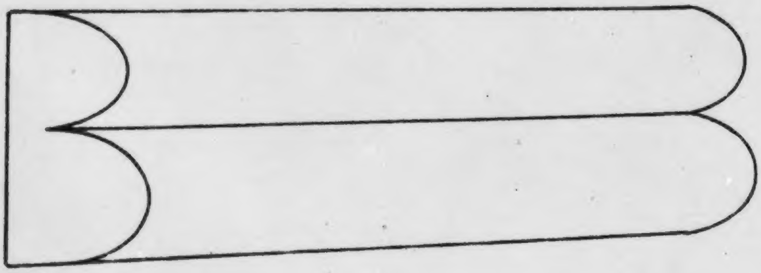
The heaviness of the metal sheet you pick will be decided by the kind of plaster you are using. Generally, cement plaster may need heavier metal than molding plaster. For example: USG Hydrocal Cement would need a template made from .051" brass. USG Moulding Plaster could be shaped with .014" halfhard brass or .040" aluminum.

To mark the metal so you can cut out the template, first you coat the metal sheet with a layout dye. This is a blue due that makes it easier to see and follow the pattern. The pattern is scribed (scratched) full size on the metal sheet after the dye is dry. Then cut out the shape and carefully file off any rough parts.

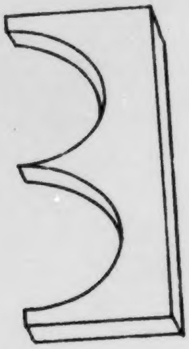


Template on a sled. It is being used to screed a cornice molding.

Anything that is left on the edge of the template will show up in the plaster. The template is made with the reverse of the final shape you want.



To make this cornice piece, where the round parts come out from the wall, you will have to cut out a template pattern shaped like this:



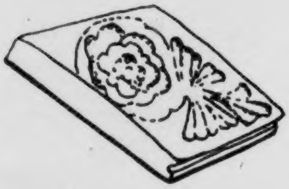
Sled

This is a frame that is used to hold the template firm and steady while it is being used to screed the plaster shape. It is usually made with wood and the template is nailed to it. The sled supports, guides and steadies the template.

Plaster can be screeded (formed into a shape) when it is "in-place" on the wall, or it can be screeded on a work bench or work table if it is found and then placed after it has dried, it is called bench work.

Form Molds

Form molds can be used to make intricate patterns and special shapes. The form mold is very convenient if you will be making a lot of any one thing. To use the form mold, plaster is poured into a rubber mold and allowed to set. The form mold is encased in plaster to make it more stable.



There are premade form molds. When using form molds, be sure to follow any special manufacturer's directions for their use.

METHODS USED IN ORNAMENTAL PLASTERING

Straight mold work and circular mold work are the most common ways to form plaster into ornamental shapes. Both can be done in the shop (or on a work bench) and installed at the job site later. Or they can be screeded directly on the wall or ceiling. When the work is screeded on the wall or ceiling, this is called "run-in-place" work.

When pieces have been made on the work bench or at the shop for later installation, there are two main ways of attaching the ornamental plaster work. One is to use mechanical fasteners. The other is done by using a gypsum plaster to put them in place and hold them there. This last way can also be called "adhesive fastening."

Straight Mold Work

This method can be used to make many different shapes. It can form the plaster into any contours. The method is to screed a strip of plaster with the template that has been put on a sled.

If you are doing bench work, let some of the plaster lap over the end of the bench. This will help by acting as an anchor for the strip of plaster. Plaster lapped over the end will help keep the strip from moving forward when the strip of plaster is being screeded. Another thing that can help is to put small lumps of modeling clay on the work bench before the plaster is put down. This will help give the plaster a grip on the surface of the work bench.

Mixing Hints: The first mix should be made a bit below the normal consistency. Let it cream a short time before it is put on the bench. If the plaster will be formed-in-place, make it a bit stiffer.

Circular Mold Work

Circular mold work can be a very precise skill. You need experience, patience, experience and experience. This type of work will usually be done by expert plasterers.

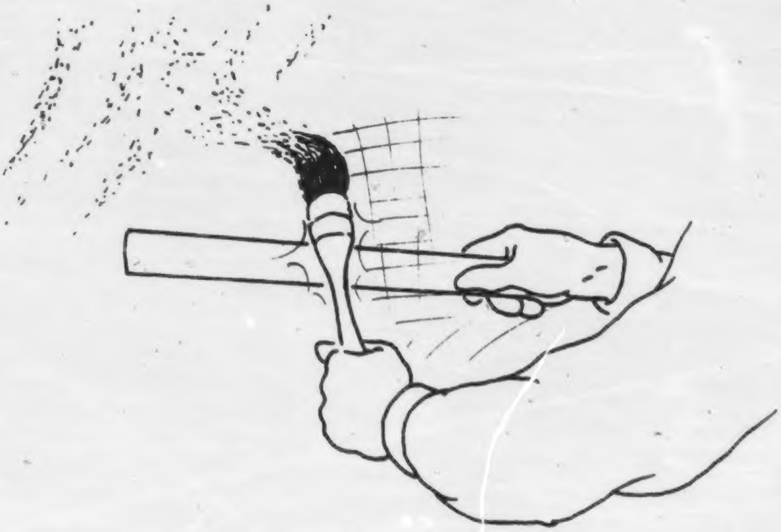
The accuracy of this kind of mold work can be very fine. Tolerances within 0.005" can be made with a good template and a well-made, well-anchored pivot on the sled.

The pivot point is the key to good circular mold work. The pivot is a piece connecting the template/sled and the anchoring device. It must be rigid. It has to be set higher than the top of the pattern being screeded out of the plaster. This is to keep it from scratching the plaster. So, the bolt used as the center post (or anchoring device) has a running thread with a double nut lock. This is so that it can be adjusted for height if necessary.

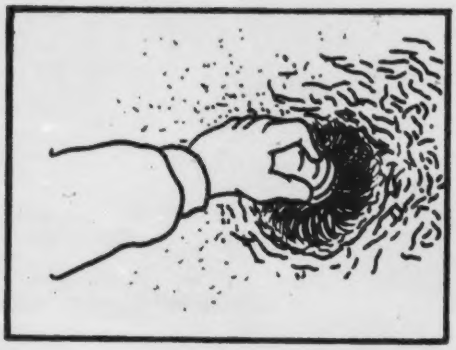
When doing bench work, the center post is put in a hole in the bench to work as an anchor. When doing forming-in-place work, the center post has to be in the exact center of the shape that is being screeded. It must be very well anchored or braced to structural supports.

MAKING PLASTER LOOK LIKE SOMETHING ELSE

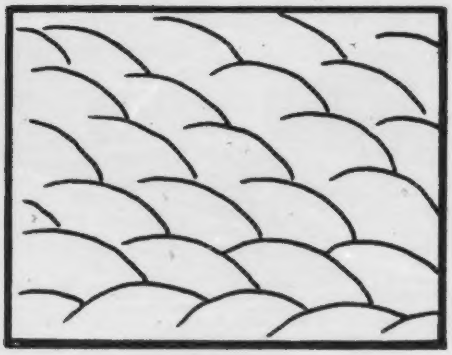
Below and on the following page are just a few of the patterns and textures that can be made with plaster materials. Almost anything that can be imagined can be done.



Spattering color onto a surface.



Using a stippling brush to make a texture.



Trowel finish made with arcing strokes.

Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. Metal ______________ are used to make templates.

2. ______________ describes when the plaster is getting thick.

3. ______________ mold work and ______________ mold work are the most common ways to form plaster into ornamental shapes.

4. Plaster should be sifted into the water ______________ and ______________.

5. The main type of ornamental plastering is making ______________ shapes with plaster.

6. Plaster can be made to look like something else with ______________ and ______________.

7. Steel is not used to make templates because it ______________.

8. Gypsum cement is often used for work that will have ______________ sections or parts.

9. When doing bench work, let some of the plaster ______________ over the ______________ of the ______________.

10. When mixing by hand, stir from the ______________ to force the plaster to the ______________.

11. The frame used to hold the template steady is called a ______________.

12. Molding plaster is a ______________ or ______________ purpose plaster.

13. The pivot must be ______________ and well ______________.

14. The two main ornamental plaster materials are gypsum ______________ and ______________ plaster.

15. To use a form mold, plaster is ______________ into ______________ mold and allowed to ______________.

Self Assessment Answers

1. sheets
2. creaming
3. straight, circular
4. slowly, evenly
5. fancy
6. textures, patterns
7. rusts
8. thin
9. lap, end, bench
10. bottom, top
11. sled
12. utility, general
13. rigid, supported
14. cement, molding
15. poured, rubber, set

Assignment

COMPLETE THE FOLLOWING ASSIGNMENT.

Find at least 5 different examples of ornamental plastering. Describe how you think each was done. Be as detailed as you can in the description of how you think it was done.

EXAMPLE	LOCATION	HOW IT WAS DONE

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ Before scribing the metal in the shape you want, it should be coated with a layout dye.

2. ____ It is easy to overmix a batch when mixing by machine.

3. ____ Circular mold work is the easiest kind of ornamental work to do.

4. ____ Anything on the edge of the template will show up in the plaster.

5. ____ Gypsum cement is not as strong as molding plaster.

6. ____ Generally, cement plaster may need a heavier metal template than molding plaster.

7. ____ Straight mold work cannot be used to make very many different shapes.

8. ____ When mixing by hand or by machine, the plaster should soak in the water before it is mixed.

9. ____ Form molds can be used to make intricate patterns but not to make special shapes.

10. ____ Steel is better for making templates than aluminum.

11. ____ The time when plaster is getting thick is when it can be formed into an ornamental shape.

12. ____ When work is screeded on the wall, this is called "run-in-place" work.

Instructor Post Assessment Answers

1. T
2. T
3. F
4. T
5. F
6. T
7. F
8. T
9. F
10. F
11. T
12. T

TEMPLATES USED IN PLASTERING

Goal:

The student will be able to explain the use of templates and will make a simple template.

Performance Indicators:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

Study Guide

In order to finish this module, do the following tasks. Check each item off as you complete it.

1. ____ Read the Goal and Performance Indicators on the cover of the module. This will tell you what you will learn by studying the module, and how you will show you've learned it.

2. ____ Read the Introduction. The Introduction will tell you why the module is an important part of the plastering trade.

3. ____ Study the Vocabulary section. Vocabulary words are important for a good understanding of the trade. After you have studied the vocabulary, ask your teacher to quiz you on the words and their meanings.

4. ____ Study the Information section. This section will give you the information you need to understand the subject.

5. ____ Take the Self Assessment exam. This is a test for you to prove to yourself that you have learned the material you have studied. Compare your answers with the answers on the Self Assessment Answer Sheet, which is on the page following the Self Assessment. If you scored poorly, re-study the Information section or ask your teacher for help.

6. ____ Do the Job Sheet. Follow the instructions at the top of the Job Sheet. The tasks listed on the Job Sheet will help you develop skills which will be helpful to you.

7. ____ Take the Post Assessment exam. Give the exam to your teacher after you have completed it. Your teacher will grade it for you.

Introduction

This module will give you some basic information about templates. The template is a tool that the plasterer has to make. They can be very difficult to make and use. An example would be a template for making an ornamental cornice. Or a template can be much simpler to make. An example of this is cutting a board to guide you in plastering the soffit of an arch. You will learn about both of these templates in this module.

Vocabulary

Trade terms are very important for a good understanding of the trade. Study these words and meanings. When you have learned them, ask your teacher to quiz you on the words and their meanings.

CORNICE--A horizontal, molded work that projects out from a wall or column.

SOFFIT--The underside of something.

Supplementary References

1. Incentive Apprenticeship Training for Plasterers. "Unit 9: Basic Layout." 1979. pp. 20-23.

2. Plastering Skill and Practice. F. Van Den Branden. 1971. pp. 254-57, 451-60.

Information

A template is a tool that is used to control the shape or form of plaster. There are two main types of templates. They do two different things.

One type is a blockout template. It is used to block out an area that will be covered with plaster. Usually, this type of template is not a tool used to actually shape the plaster. The blockout template works mainly to show where the plaster will be put.

The other main type of template has been covered briefly in the module on ornamental plastering. This is the shaping template.

THE SHAPING TEMPLATE

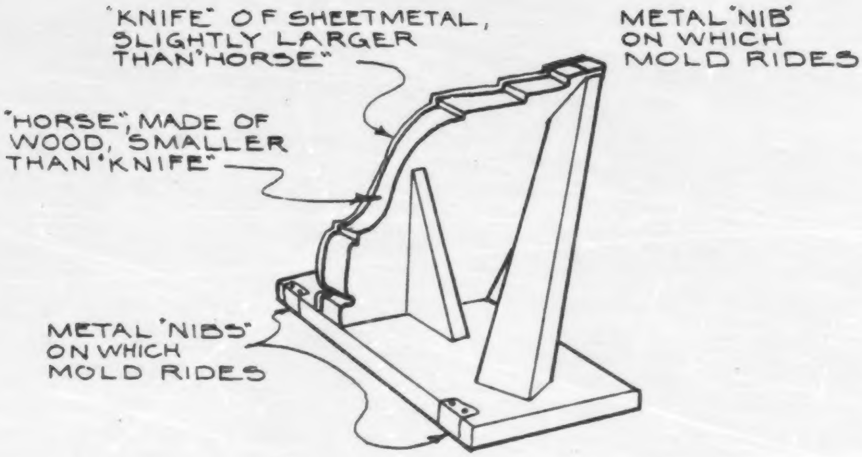
The shaping template is used to form the plaster into a certain shape. The template itself is a piece of sheet metal that has been cut to make the shape. The metal template is then attached to a supporting frame. This supporting frame is called a sled. (See the illustration on the top of the following page.)

The illustration on the next page shows the supporting framework of the sled. Note that the "horse" part of the sled is the same shape as the template (the knife part of the sled), but the horse is cut smaller than the template.

This sled is made to form a cornice. The following describes one way a template can be used to make a cornice.

Getting Ready

1. The brown coat should be applied to walls and ceiling before getting ready to put on the cornice work.


"KNIFE" OF SHEETMETAL, SLIGHTLY LARGER THAN "HORSE"
METAL "NIB" ON WHICH MOLD RIDES
"HORSE", MADE OF WOOD, SMALLER THAN "KNIFE"
METAL "NIBS" ON WHICH MOLD RIDES

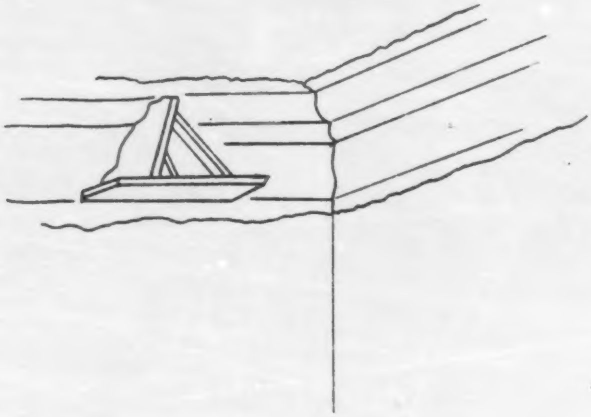
2. After this, prepare the corners.
    a. Screed a thin coat of lime-putty plaster over the brown coat in the corners.
    b. Straighten this work.
    c. A featheredge is probably the easiest to use.
3. Then darby on a second coat to bring the work to a smooth finish.

Marking the Room

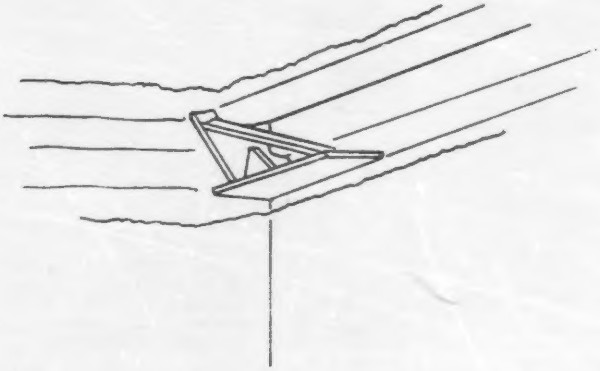
Mark where the top edge and the bottom edge of the template will go on the wall. Do this by holding the sled in place and scribing on the wall to show where the top and the bottom of the template will be on the wall. (See the illustration on the top of the next page.)

This should be done on two walls that are on opposite sides of the room.

To mark the other walls, use a level to bring the bottom line around the corner.



You do not have to bring the top line around this way. Instead, use the sled. Set it with the bottom on the line you brought around the corner by using the level. Now scribe in the top line by marking from the top of the template.



Use these lines you have made on all the walls as guides for setting chalklines. Snap top chalklines on all the walls. This is the line that will be the closest to the ceiling. This top chalkline will be your guide for setting the sled runner.

Setting the Sled Runner

This is a strip of wood that the sled will rest on and which will guide the sled when it is used to shape the plaster. The runner goes all around the room. The bottom of the sled will go on top of the runner. The runner will help you hold the sled steady when you guide it around the room to form the plaster.

(This is also called run-in-place work because it is being done on the wall rather than on a workbench.)

To start setting the sled runner, nail a strip of wood at one of the bottom lines you made in one of the corners. This is the only strip of wood you will nail by using the bottom line as a guide. To nail the other runner boards, set the top of the template at the top of the chalkline. Nail the runner board so that the base of the sled can rest on the board when the top of the template is at the top chalkline.

It is important to use the top chalkline as your guide for the runner boards. If anything is uneven, it would be seen next to the ceiling much more than where the bottom part of the cornice will be. Place and nail the runner board where you have to, just be sure the top line is kept straight.

Running the Cornice

Some guidelines for mixing plaster are given in the module on ornamental plastering. You will also have to very carefully follow the specific instructions for the type of plaster you are using. Since this work would be run-in-place, the plaster should be made quite stiff.

Blocking out: To start running the cornice, set the sled on the runner boards. Apply plaster in front of the sled and then push the sled into the plaster. A second person is needed to catch dropping plaster.

You are making the rough shape of the cornice with this first run. Move the sled back and forth on the runner boards until this "rough" shape is well formed.

Stuffing the mold: For this part of the work, a retarder should be added to the plaster to keep it from getting hard too fast. Also, the plaster should be mixed in small batches. Mix it only as you use it; don't try to mix ahead.

This plaster is applied in front of the sled and then held in place. You can use a trowel or a gloved hand to hold the plaster in place. Then the template on its sled is used to shape the plaster.

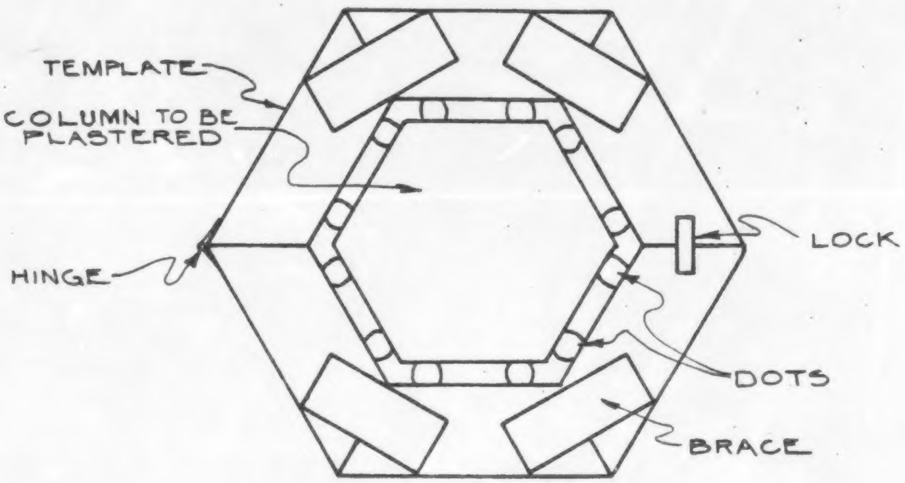
NOTES

1. You can give the plaster material a nice polish by splashing on a little bit of water just before you do the last run with the sled.
2. Control the set time carefully. If the plaster sets too fast, it may swell up a bit while you are working on it. This can warp the shape of the cornice.

THE BLOCKOUT TEMPLATE

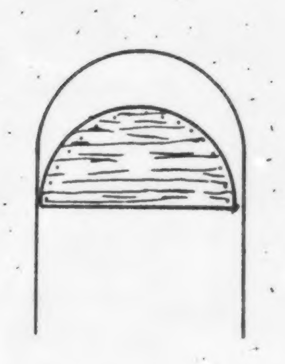
This type of template is used to show the area that will be covered with plaster. It can be used as a guide for setting screeds, or, in some cases, as a sort of screed by itself (as in one of the following examples for plastering the soffit of an arch). The blockout template does not push, cut or scrape the plaster to get it into the right shape.

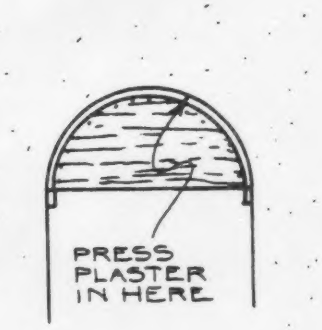
Covering a Column



The illustration above shows how dots can be established on a column by using a hinged wood template. When setting dots for column screeds, you can either set the bottom dots or the top dots. If you set the top dots, use a plumb bob to establish the bottom ones. If you set the bottom ones first, you can use a rod-and-level to establish the top dots. Then establish the screeds. Establishing screeds has been discussed in detail in the module on the use of dots and screeds.

Covering the Soffit of an Arch

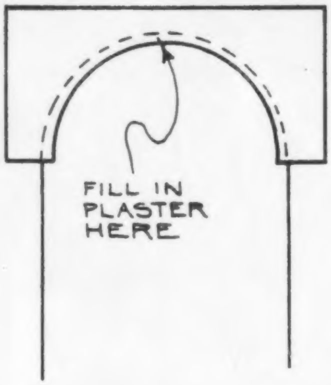




A template of wood is made to fit in the arch under the soffit (the underside of the arch). The template is made smaller than the arc of the arch. It is made to show where the arch will be AFTER it is plastered.

Set this template in place as shown. Put plaster dots in the space between the soffit and the template. Remove the template and establish screeds for the soffit and the walls. Then plaster the walls and the soffit.

To cover the soffit of an arch with this method, you will need to make two wood templates. These templates are put on each side of the arch. They are made to show how thick the plaster should be. You can use the edges of the template arc as a kind of screed for plastering the soffit. After the soffit has been plastered, take the templates down. Then plaster the walls of the arch to fit the newly plastered soffit.



Self Assessment

COMPLETE THE FOLLOWING STATEMENTS BY WRITING THE CORRECT WORD OR WORDS IN THE BLANKS PROVIDED.

1. When marking the wall for a cornice, mark where the ______________ and the ______________ of the template touch the wall.

2. If you set the top dots of a column screed, use a ______________ ______________ to set the bottom dots.

3. A template is a tool that is used to control the ______________ or ______________ of the plaster.

4. Only the ______________ line is brought around the corner with the level.

5. The shaping type of template is used to make the plaster into a certain ______________.

6. When nailing the runner boards, be sure to keep the top line ______________.

7. Before doing cornice work, the ______________ ______________ should be applied to the wall.

8. Only the ______________ line is snapped with a chalkline.

9. The ______________ ______________ of the template is called a sled.

10. The ______________ of the sled goes on top of the ______________.

11. The ______________ part of the sled is the same shape as the template, only it is ______________.

12. The blockout type of template works mainly to ______________ ____________ the plaster will ______________.

Self Assessment Answers

1. top, bottom
2. plumb bob
3. shape, form
4. bottom
5. shape
6. straight
7. brown coat
8. top
9. supporting frame
10. bottom, runner
11. horse, smaller
12. show where, go

Job Sheet

COMPLETE THE FOLLOWING TASKS.

Materials and Tools

metal sheets
cutting tools
layout dye
wood
fasteners
wood working tools

1. Make a template for a simple cornice.
2. Make a sled for the template that could be used for run-in-place work.
3. Attach the template to this sled.

Extra Credit

1. Read the module on ornamental plastering.
2. Make another simple template.
3. Make a sled for this template that could be used to form a cornice on a work bench.
4. Practice using the template to do bench work.

NOTE: Layout dye for staining the metal is available from patternmakers' supply houses. The dye should be dry before the pattern is scribed on the metal.

Post Assessment

LISTED BELOW ARE SEVERAL STATEMENTS. IF THE STATEMENT IS TRUE, PLACE A "T" IN THE BLANK PROVIDED. IF THE STATEMENT IS FALSE, PLACE AN "F" IN THE BLANK.

1. ____ An uneven line next to the ceiling is the easiest line to see as being uneven.

2. ____ One way to plaster the soffit of an arch is to attach templates on both sides of the soffit.

3. ____ Only one runner board is set by the bottom line.

4. ____ A chalkline is snapped to make the bottom line all around the room.

5. ____ Plaster applied in the last step of forming a cornice has to be held in place with a gloved hand or a trowel.

6. ____ Stuffing the mold is a way to use up any left over plaster.

7. ____ The blockout type of template scrapes off plaster to form a shape.

8. ____ When marking the wall to show where the line will go, be sure to mark the lines on walls that are next to each other.

9. ____ It is best to mix a batch of plaster large enough for the whole job so that you are sure everything will be the same in the batch.

10. ____ A shaping template is made of metal.

11. ____ Blocking out is the last step of making a plaster cornice.

12. ____ The "horse" part of the sled is the part that does the shaping of the plaster.

Instructor Post Assessment Answers

1. T

2. T

3. T

4. F

5. T

6. F

7. F

8. F

9. F

10. T

11. F

12. F